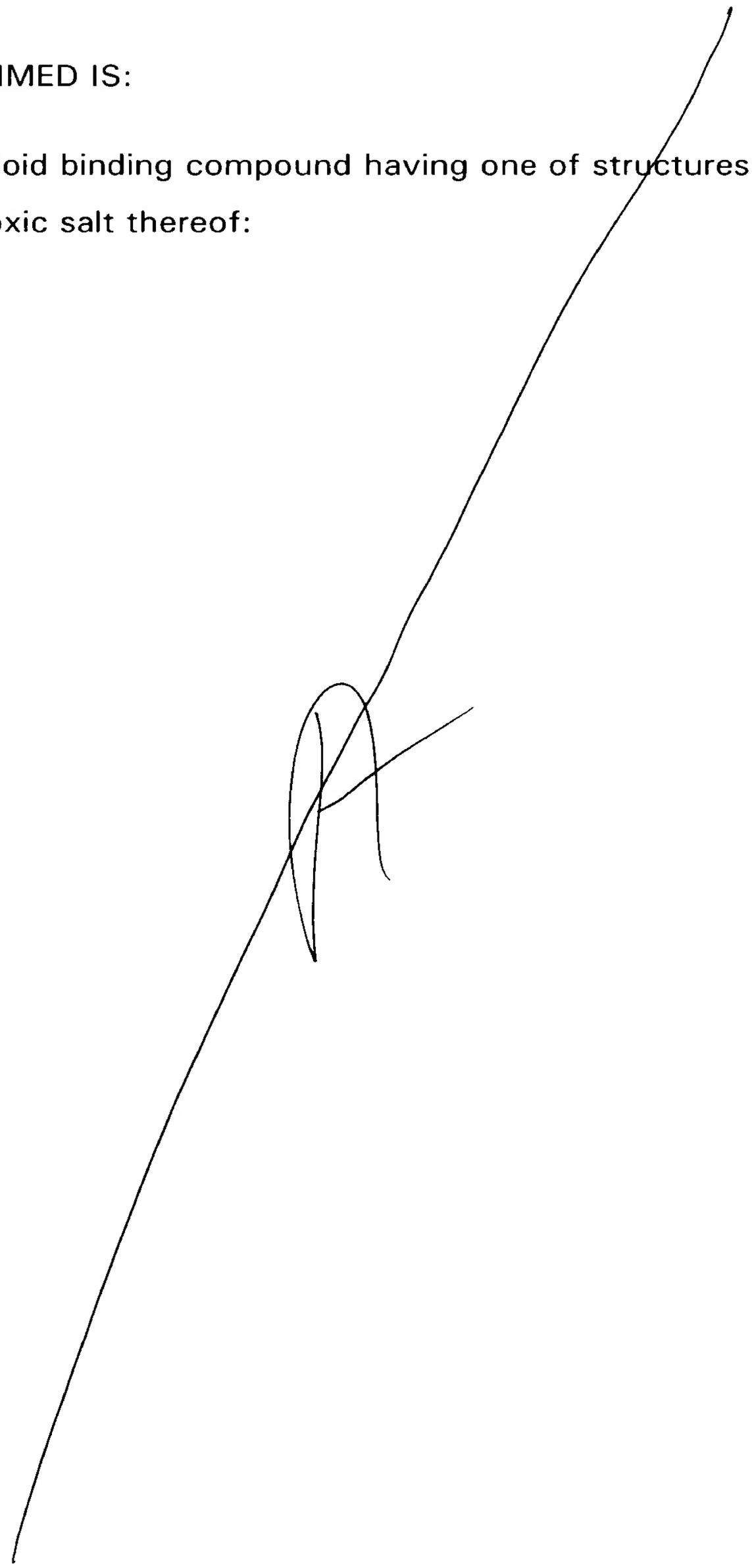
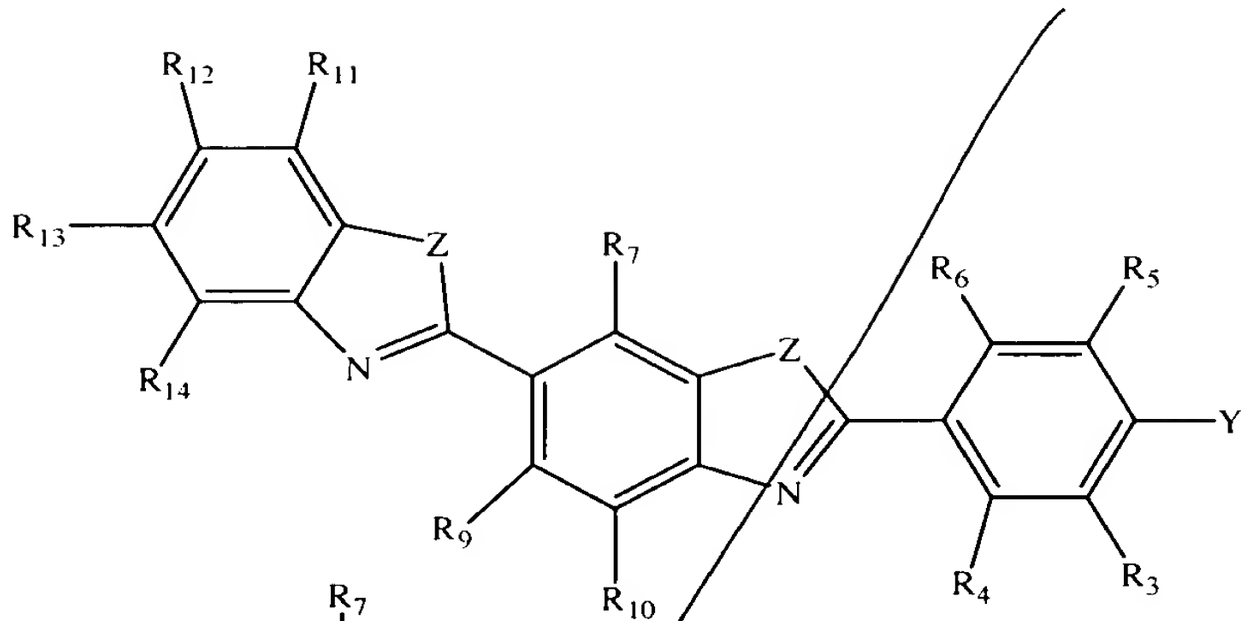
WHAT IS CLAIMED IS:

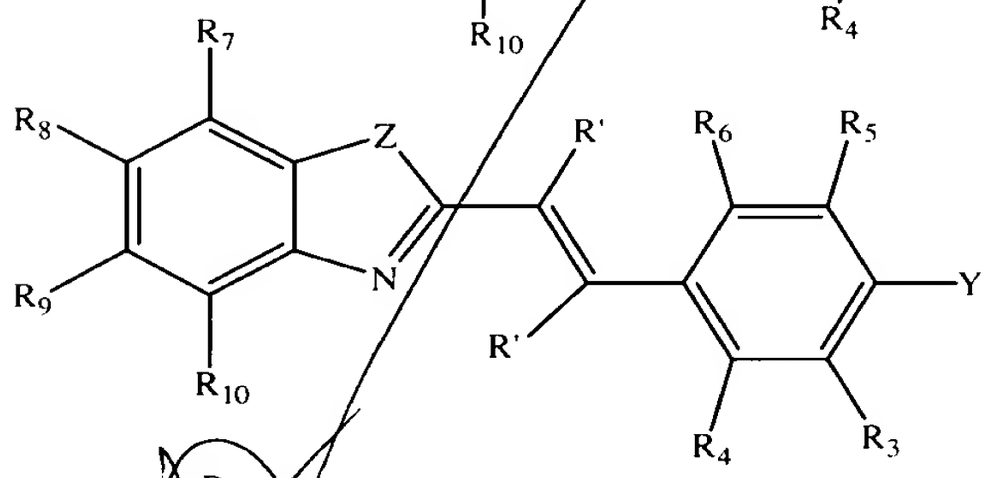
1. An amyloid binding compound having one of structures A-E or a water soluble, non-toxic salt thereof:



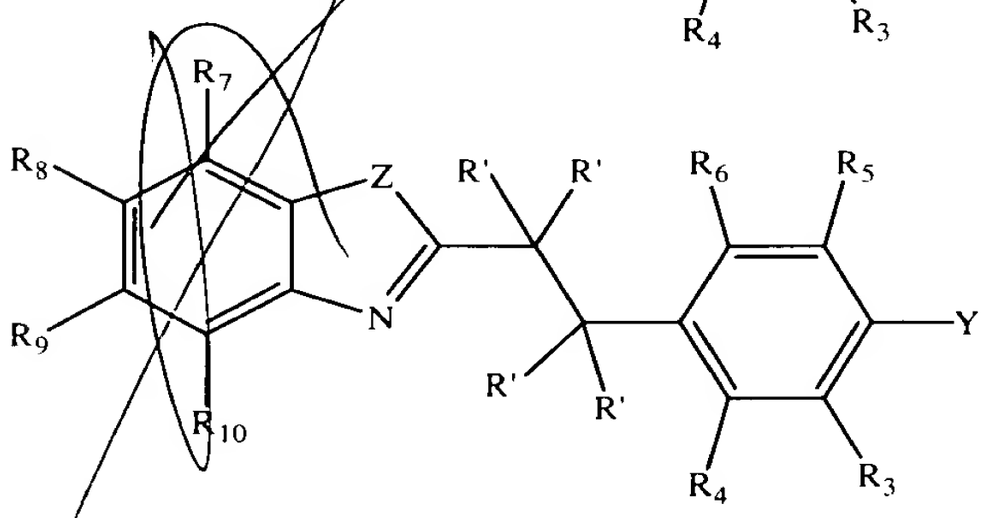
Structure A



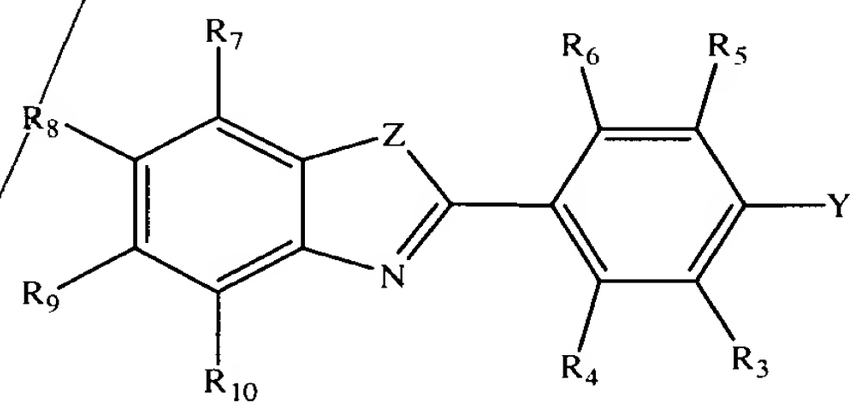
Structure B



Structure C

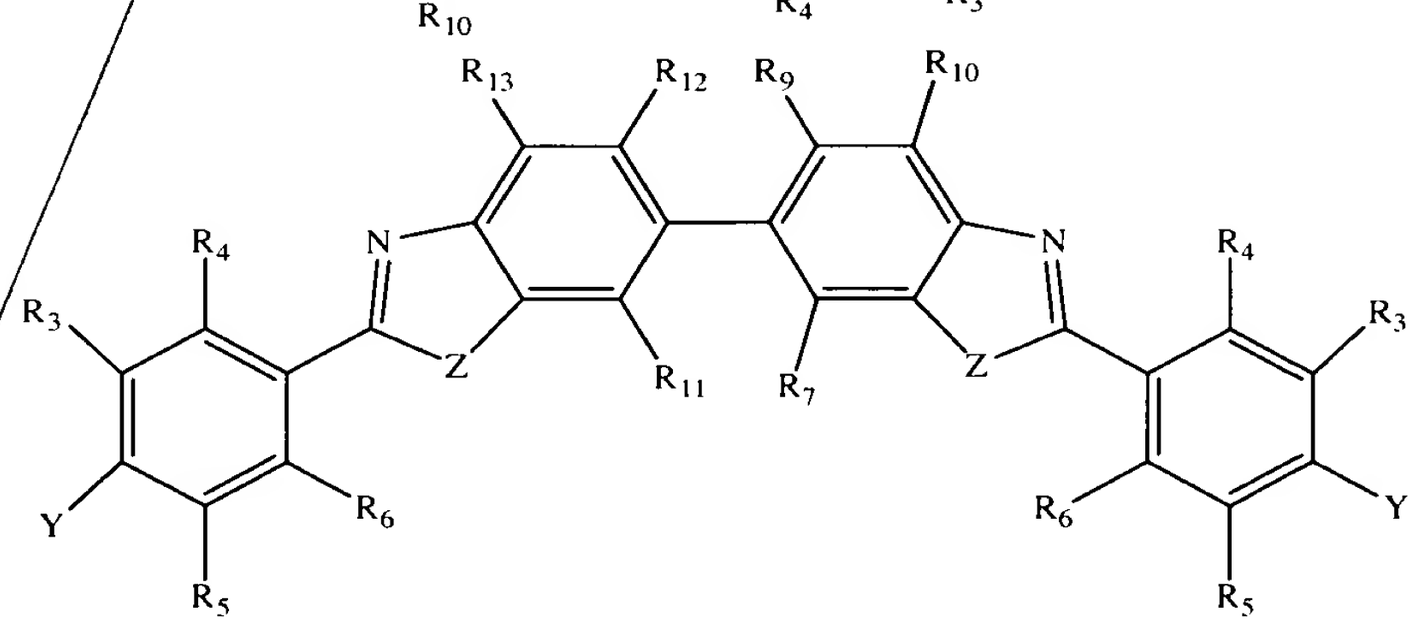


Structure D

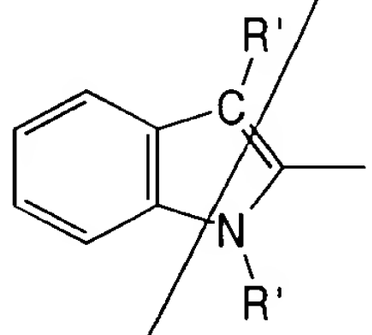


or

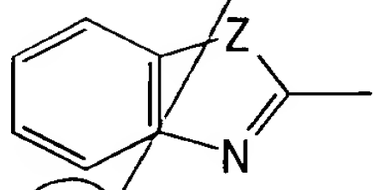
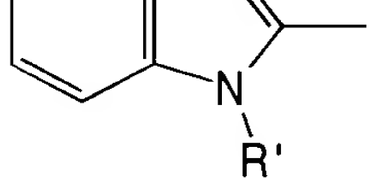
Structure E



wherein Z is S, NR', O or CR' in which case the correct tautomeric form of the heterocyclic ring becomes an indole in which R' is H or a lower alkyl group:

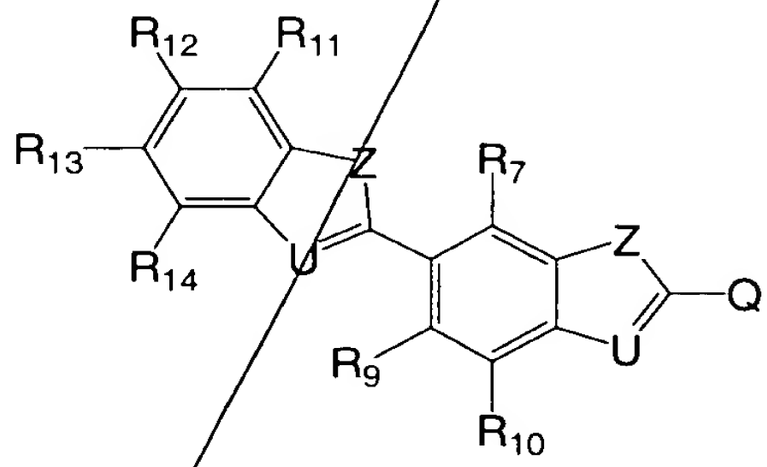


wherein Y is NR^1R^2, OR^2, or SR^2;

wherein the nitrogen of  or  is not a quaternary amine;

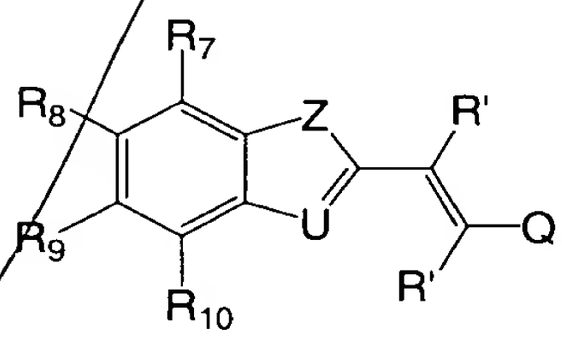
or an amyloid binding compound having one of structures F-J or a water soluble, non-toxic salt thereof:

Structure F



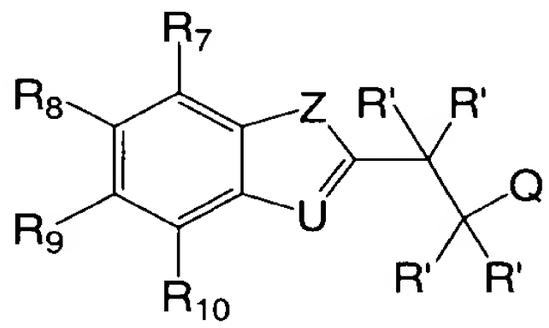
,

Structure G



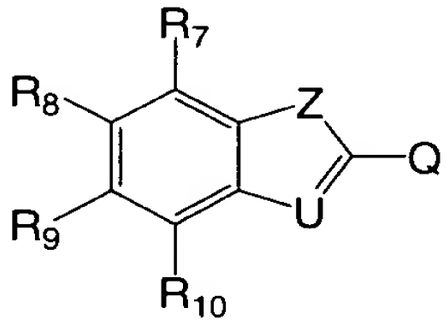
,

Structure H



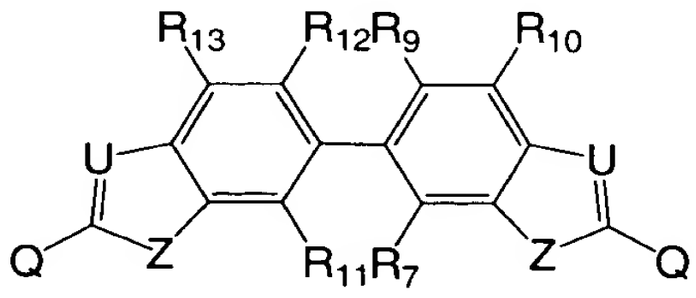
,

Structure I

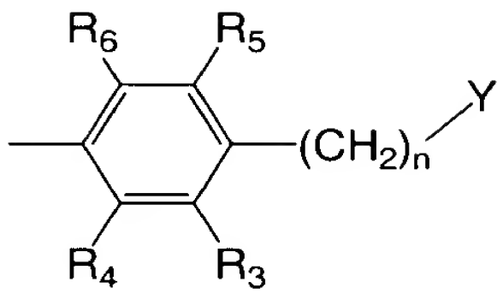


or

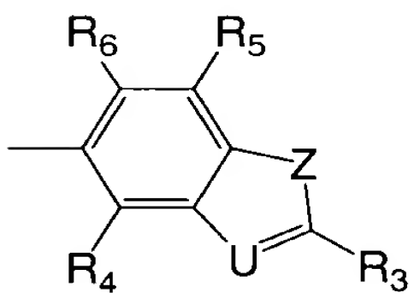
Structure J



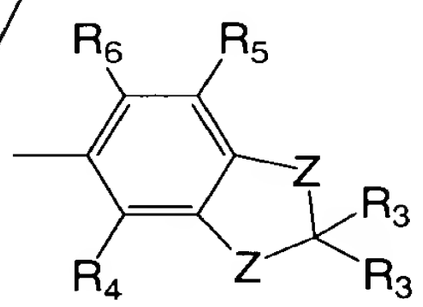
wherein each Q is independently selected from one of the following structures:



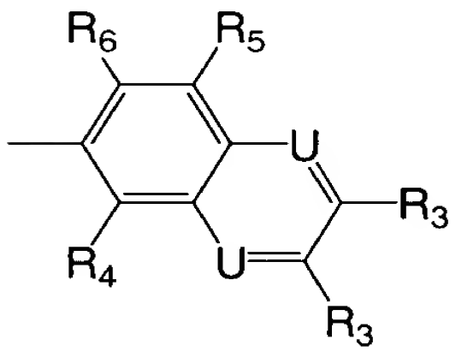
wherein n = 0, 1, 2, 3 or 4,



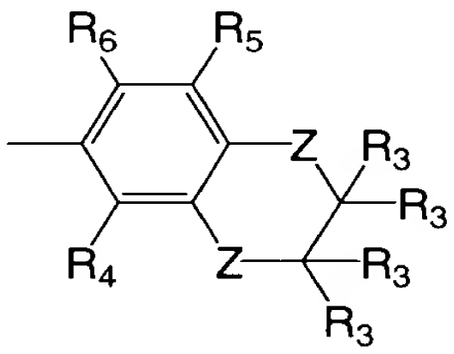
,



,

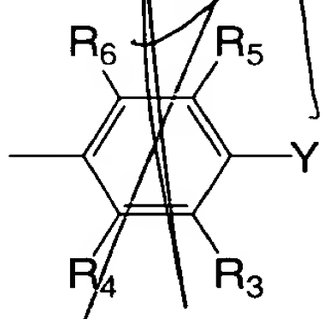


or



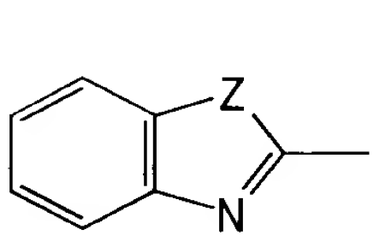
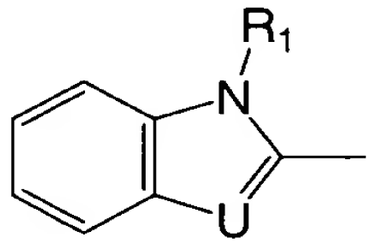
wherein Z is S, NR', O, or $C(R')_2$ in which R' is H or a lower alkyl group;

wherein U is CR' (in which R' is H or a lower alkyl group) or N (except when U



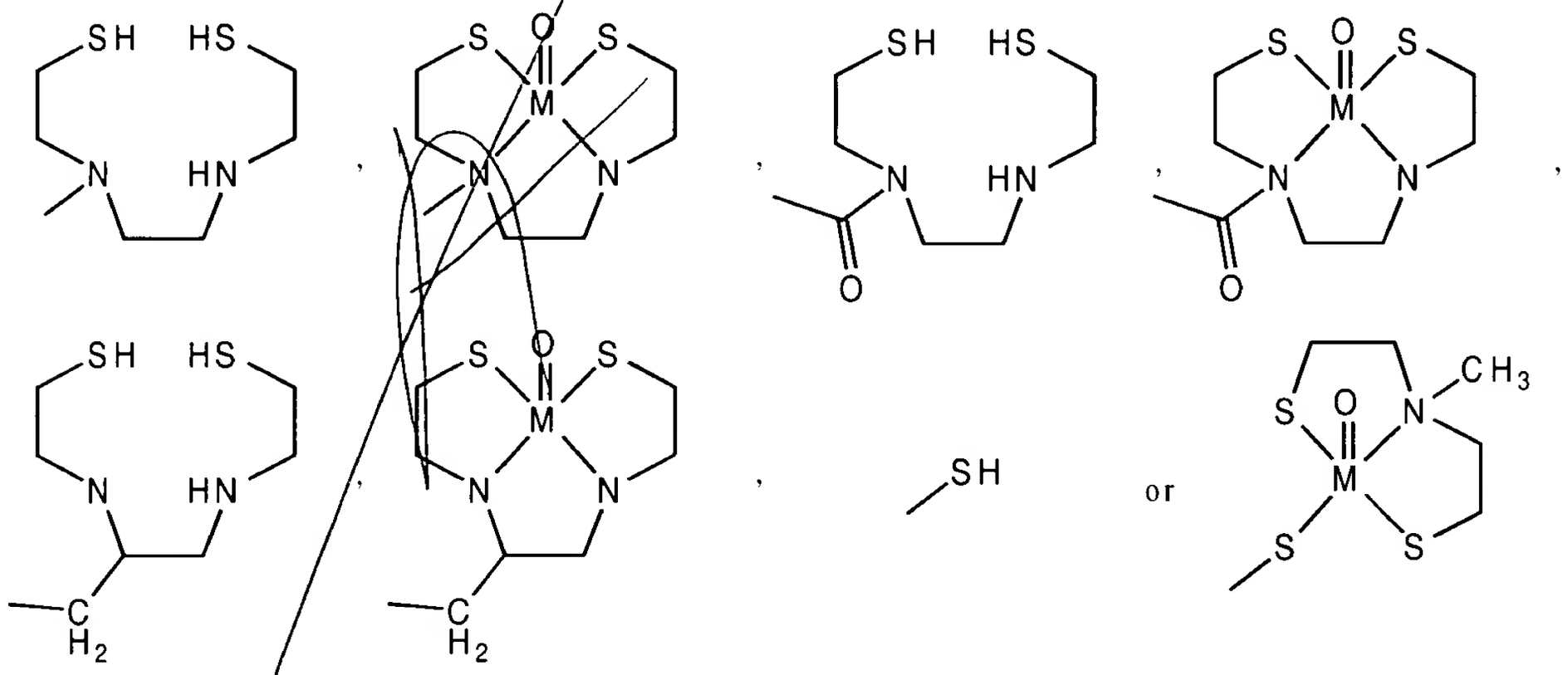
= N, then Q is not);

wherein Y is NR^1R^2, OR^2, or SR^2;

wherein the nitrogen of  or  is not a quaternary amine;

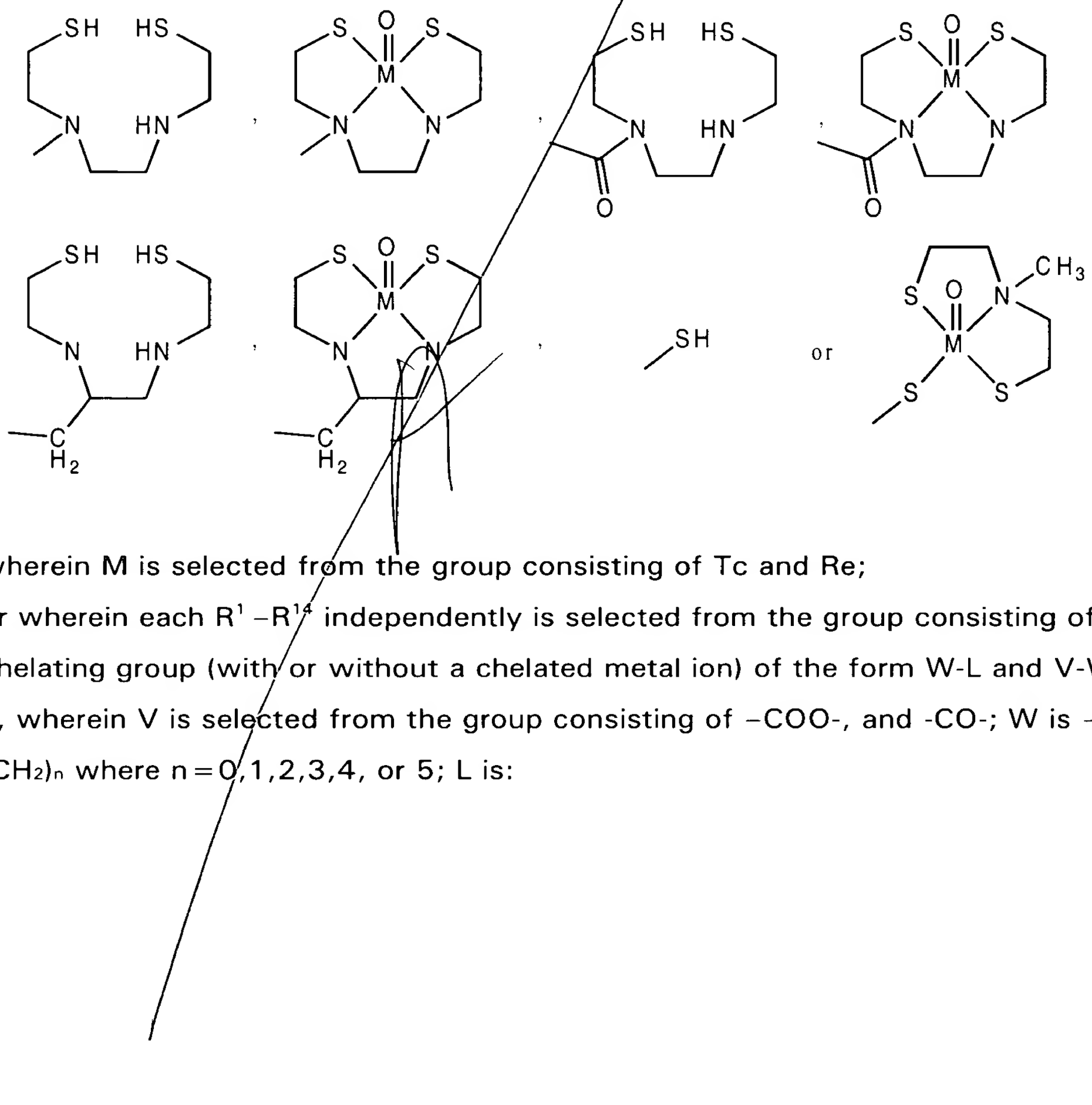
wherein each R^1 and R^2 independently is selected from the group consisting of H, a lower alkyl group, $(CH_2)_nOR'$ (wherein n = 1, 2, or 3), CF_3, CH_2-CH_2X, CH_2-CH_2-CH_2X (wherein X = F, Cl, Br or I), (C = O)-R', R_{ph}, and $(CH_2)_nR_{ph}$ (wherein n = 1, 2, 3, or 4 and R_{ph} represents an unsubstituted or substituted phenyl group with the phenyl substituents being chosen from any of the non-phenyl substituents defined below for R^3-R^{14} and R' is H or a lower alkyl group);

and wherein each R^3-R^{14} independently is selected from the group consisting of H, F, Cl, Br, I, a lower alkyl group, $(CH_2)_nOR'$ (wherein n = 1, 2, or 3), CF_3, CH_2-CH_2X, O-CH_2-CH_2X, CH_2-CH_2-CH_2X, O-CH_2-CH_2-CH_2X (wherein X = F, Cl, Br or I), CN, (C = O)-R', $N(R')_2$, NO_2, $(C=O)N(R')_2$, O(CO)R', OR', SR', COOR', R_{ph}, CR' = CR'-R_{ph}, CR_2'-CR_2'-R_{ph} (wherein R_{ph} represents an unsubstituted or substituted phenyl group with the phenyl substituents being chosen from any of the non-phenyl substituents defined for R^1-R^{14} and wherein R' is H or a lower alkyl group), a tri-alkyl tin and a chelating group (with or without a chelated metal group) of the form W-L or V-W-L, wherein V is selected from the group consisting of –COO-, -CO-, -CH_2O- and -CH_2NH-; W is $-(CH_2)_n$ where n = 0,1,2,3,4, or 5; and L is:



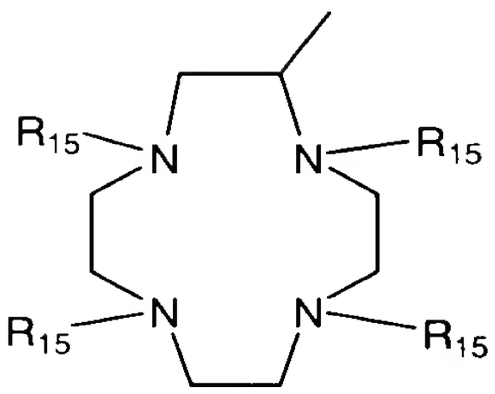
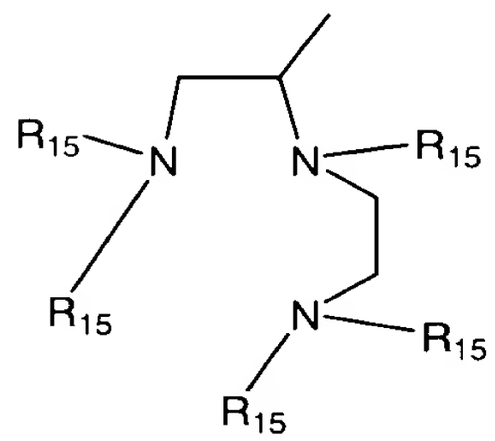
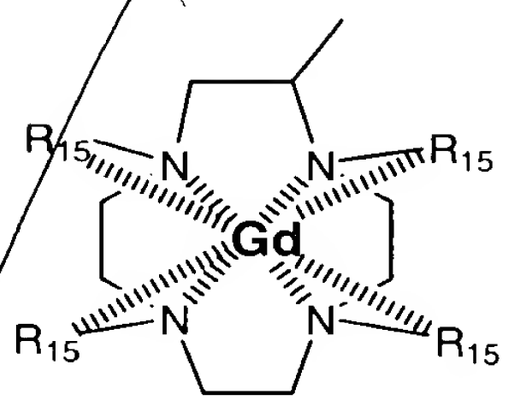
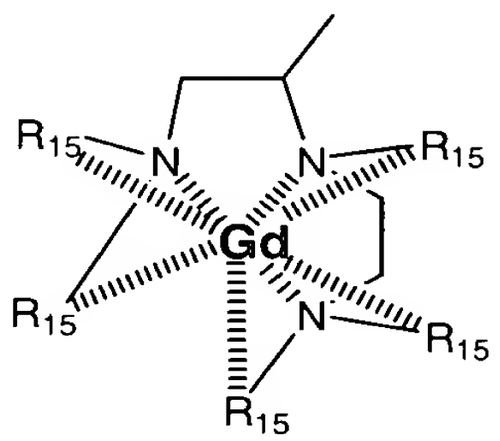
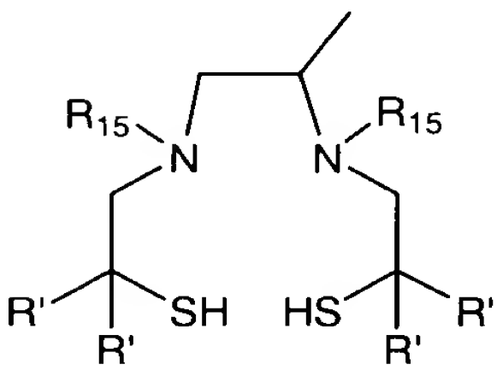
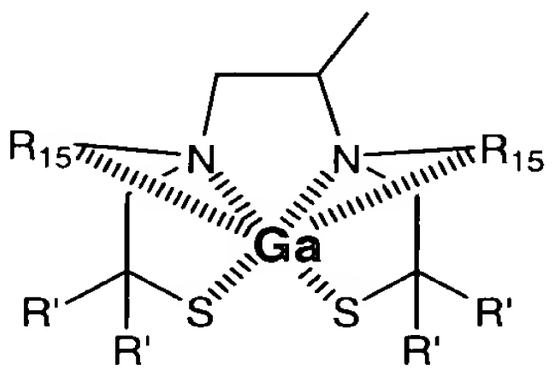
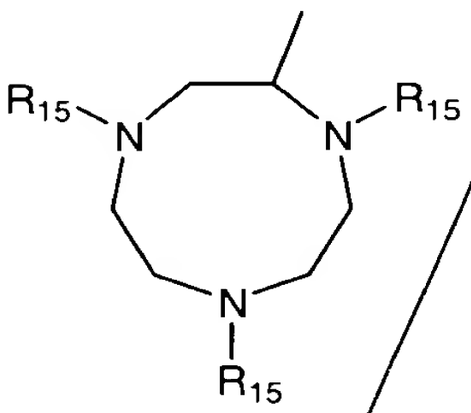
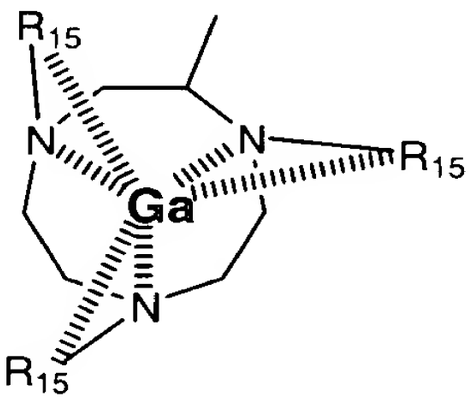
wherein M is selected from the group consisting of Tc and Re;

or wherein each R^1 and R^2 is a chelating group (with or without a chelated metal group) of the form W-L , wherein W is $-(CH_2)_n$ where n = 2,3,4, or 5; and L is:



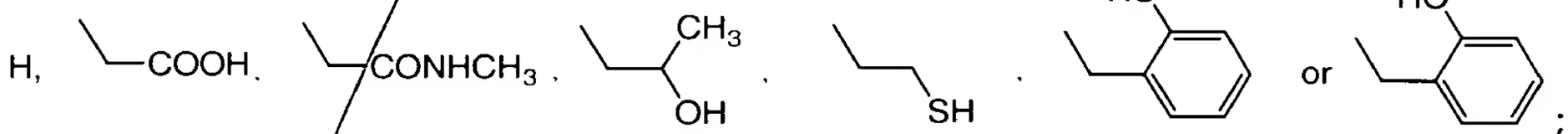
wherein M is selected from the group consisting of Tc and Re;

or wherein each R^1 –R^{14} independently is selected from the group consisting of a chelating group (with or without a chelated metal ion) of the form W-L and V-W-L, wherein V is selected from the group consisting of –COO-, and -CO-; W is $-(CH_2)_n$ where n = 0,1,2,3,4, or 5; L is:

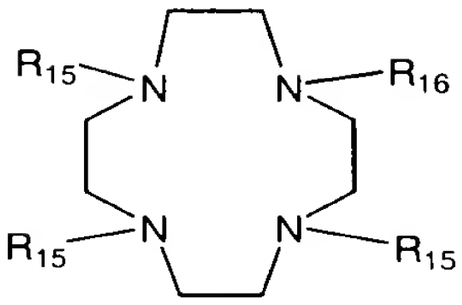
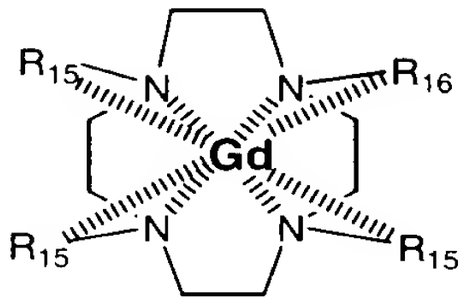
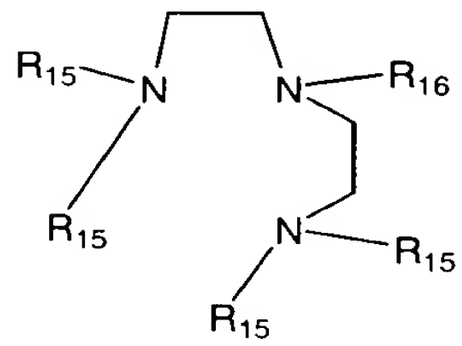
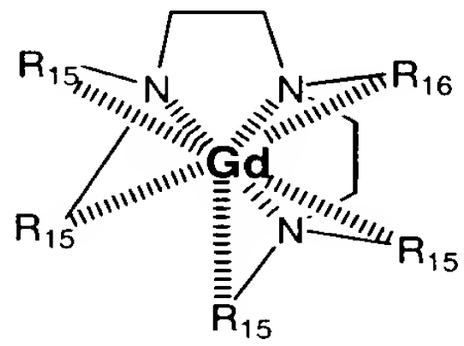
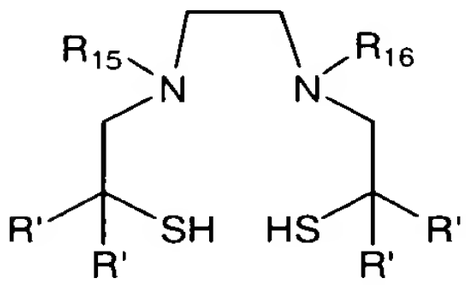
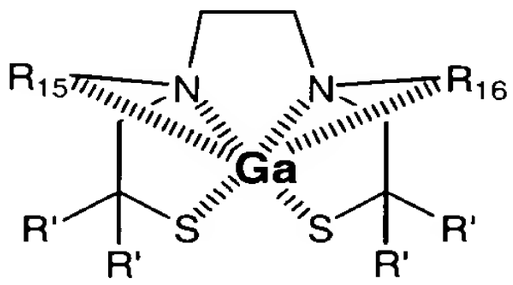
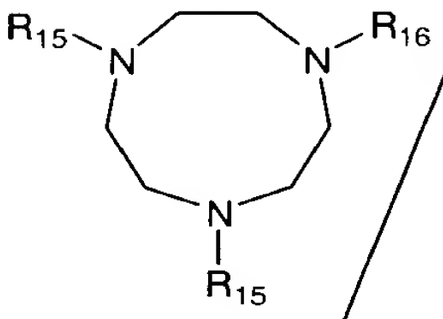
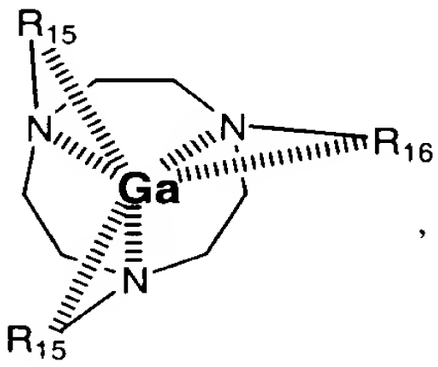
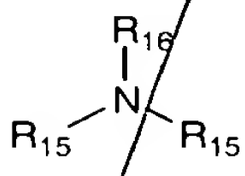
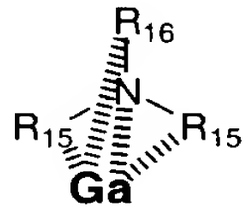









or

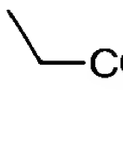
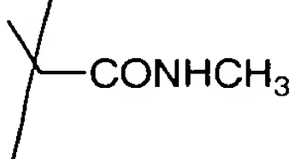
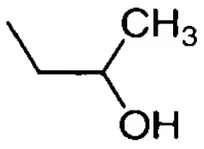
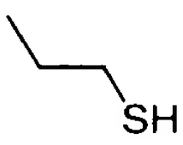
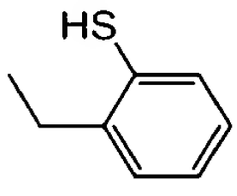
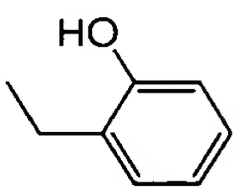
and wherein R^{15} independently is selected from the following:

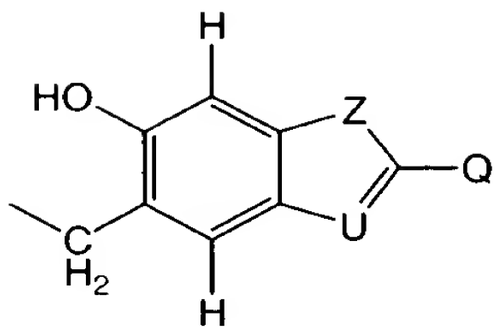
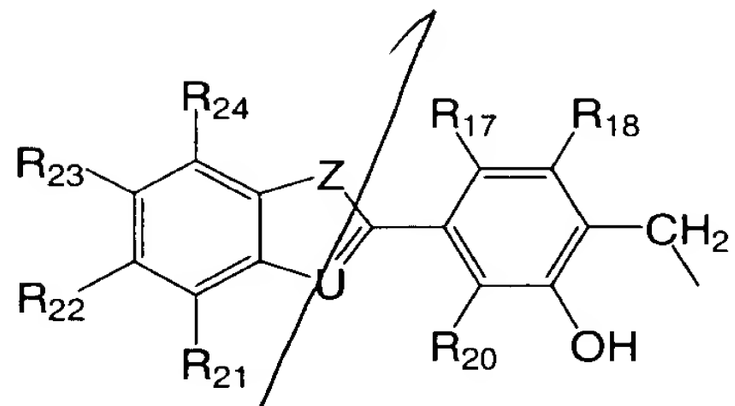


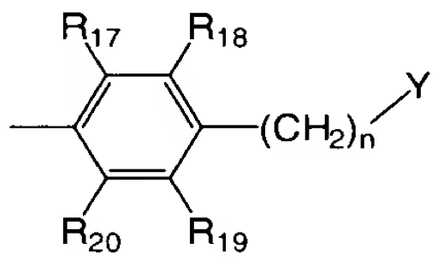
or an amyloid binding, chelating compound (with or without a chelated metal group) or a water soluble, non-toxic salt thereof of the form:

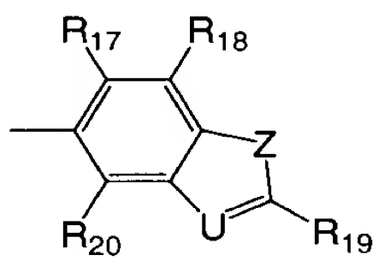
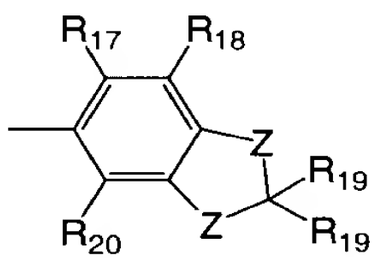









or

;

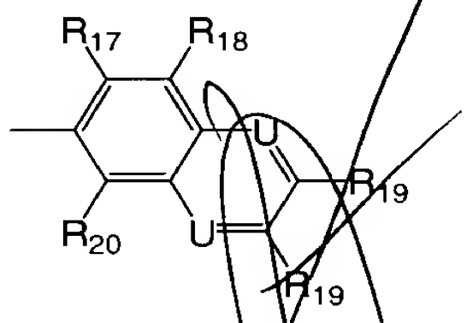
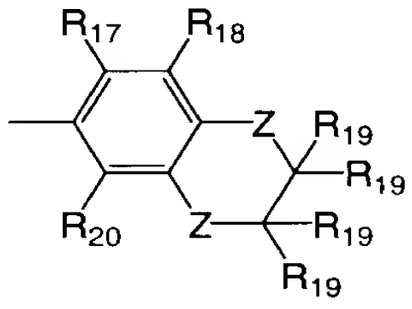
wherein R^{15} independently is selected from the following:

H,  ,  ,  ,  ,  , or  ;

and R^{16} is  or  , wherein Q is independently selected from one of the following structures:

 , wherein n = 0, 1, 2, 3 or 4,

 ,  ,

 or 

wherein Z is S, NR', O, or $C(R')_2$ in which R' is H or a lower alkyl group;

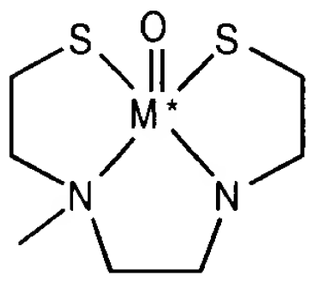
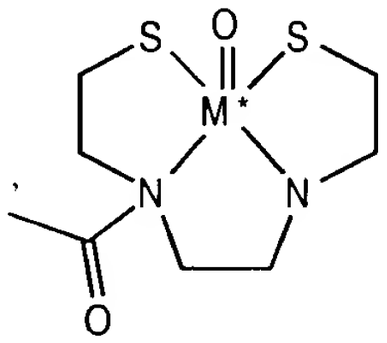
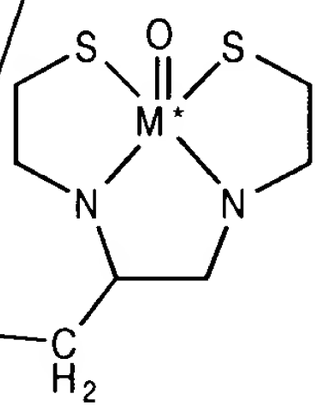
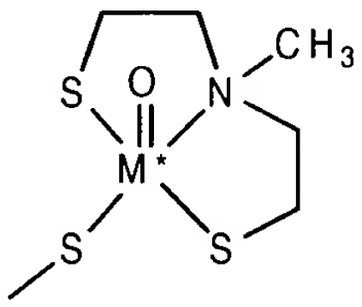
wherein U is N or CR';

wherein Y is NR^1R^2, OR^2, or SR^2 ;

wherein each R^{17}-R^{24} independently is selected from the group consisting of H, F, Cl, Br, I, a lower alkyl group, $(CH_2)_nOR'$ (wherein n = 1, 2, or 3), CF_3, CH_2-CH_2X, O-CH_2-CH_2X, CH_2-CH_2-CH_2X, O-CH_2-CH_2-CH_2X (wherein X = F, Cl, Br or I), CN, (C = O)-R', $N(R')_2$, NO_2, (C = O)$N(R')_2$, O(CO)R', OR', SR', COOR', R_{ph}, CR' = CR'-R_{ph} and CR_2'-CR_2'-R_{ph} (wherein R_{ph} represents an unsubstituted or substituted phenyl group with the phenyl substituents being chosen from any of the non-phenyl substituents defined for R^{17}-R^{20} and wherein R' is H or a lower alkyl group).

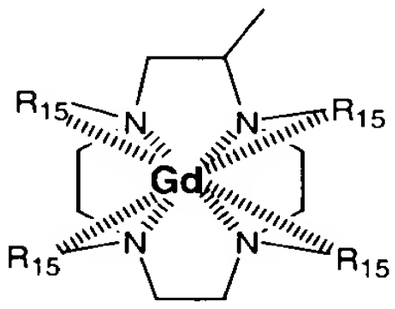
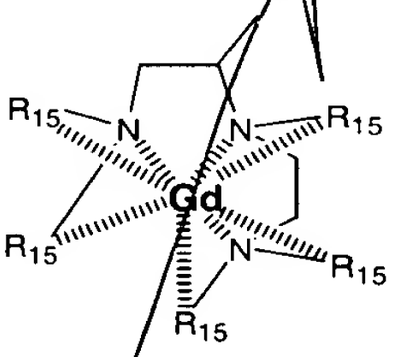
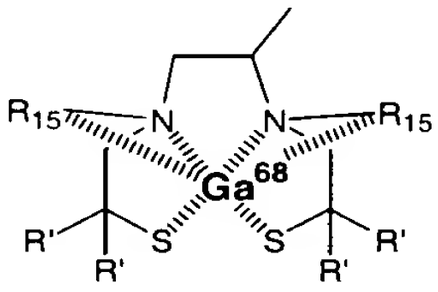
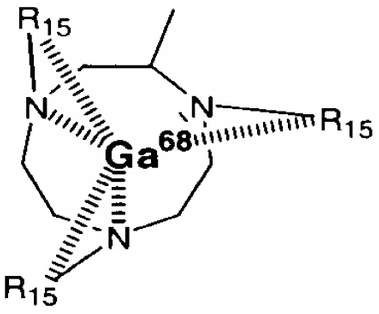
2. The compound of claim 1, wherein at least one of the substituents R^1-R^{14} is selected from the group consisting of ^{131}I, ^{123}I, ^{76}Br, ^{75}Br, ^{18}F, CH_2-CH_2-X*, O-

CH_2-CH_2-X*, CH_2-CH_2-CH_2-X*, O- CH_2-CH_2-CH_2-X* (wherein X* = ^{131}I, ^{123}I, ^{76}Br, ^{75}Br or ^{18}F), ^{19}F, ^{125}I, a carbon-containing substituent as specified in claim 1 wherein at least one carbon is ^{11}C or ^{13}C and a chelating group (with chelated metal group) of the form W-L* or V-W-L*, wherein V is selected from the group consisting of –COO-, -CO-, -CH_2O- and -CH_2NH-; W is –$(CH_2)_n$ where n=0,1,2,3,4, or 5; and L* is:

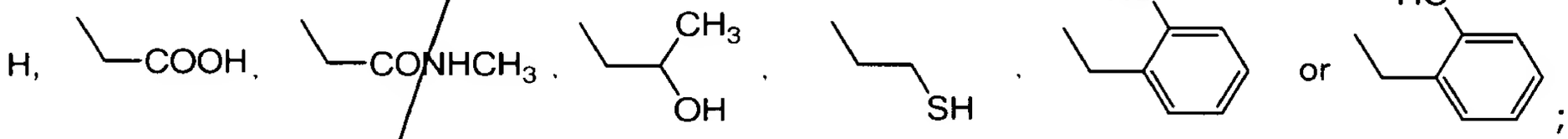



or


wherein M* is ^{99m}Tc;

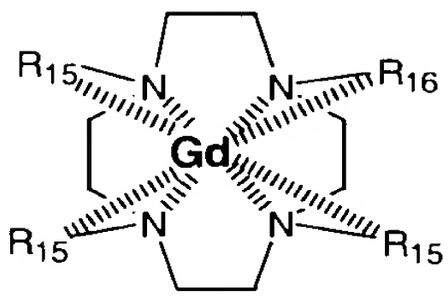
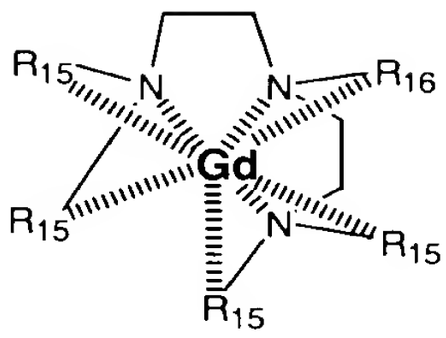
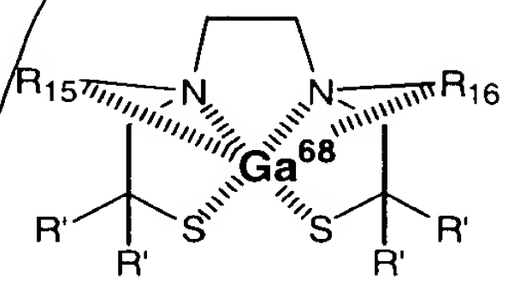
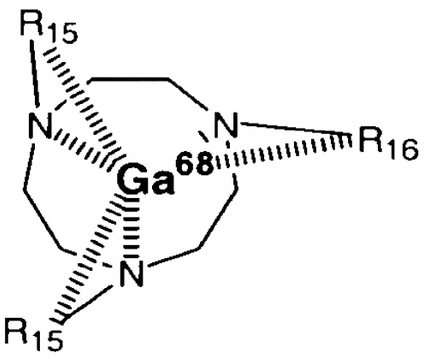
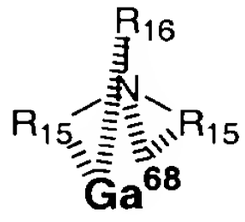
and a chelating group (with chelated metal group) of the form W-L* or V-W-L*, wherein V is selected from the group consisting of –COO-, -CO-, -CH_2O- and -CH_2NH-; W is –$(CH_2)_n$ where n=0,1,2,3,4, or 5; and L* is:




or


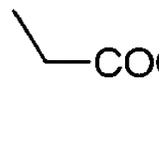
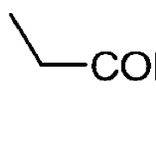
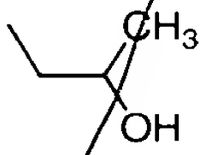
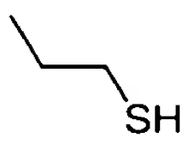
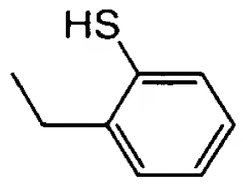
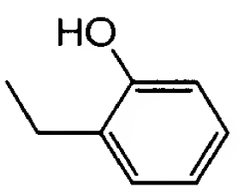
and wherein R^{15} independently is selected from the following:

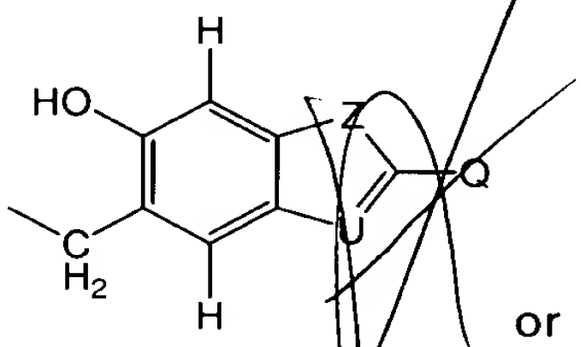
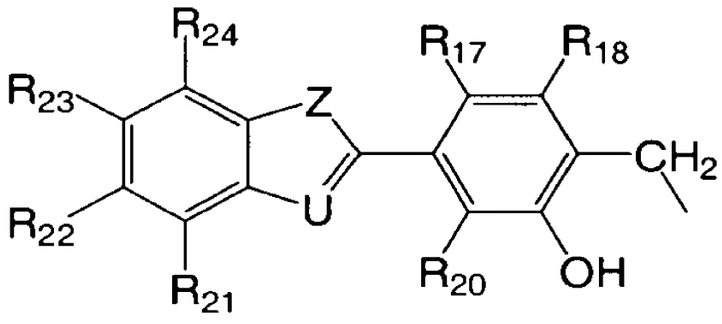


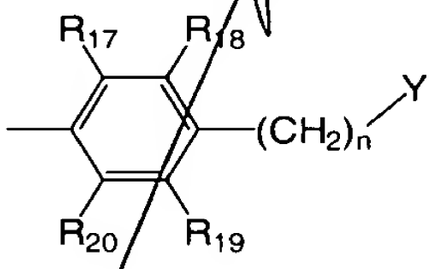
or the chelating compound of claim 1 (with chelated metal group) of the form:

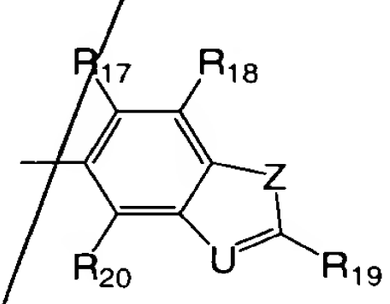
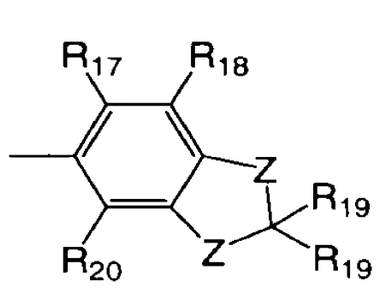




or


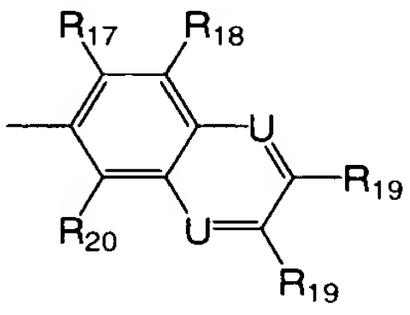
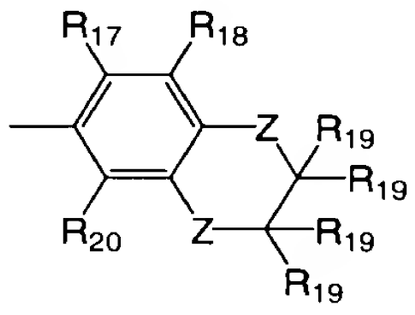
wherein R^{15} independently is selected from the following:

H,  ,  ,  ,  ,  or 

and R^{16} is  or  , wherein Q is independently selected from one of the following structures:

 wherein n = 0, 1, 2, 3 or 4,

 ,  ,

 or  ,

wherein Z is S, NR', O, or $C(R')_2$ in which R' is H or a lower alkyl group;

wherein U is N or CR';

wherein Y is NR^1R^2, OR^2, or SR^2 ;

wherein each R^{17}-R^{24} independently is selected from the group consisting of H, F, Cl, Br, I, a lower alkyl group, $(CH_2)_nOR'$ (wherein n = 1, 2, or 3), CF_3, CH_2-CH_2X, O-CH_2-CH_2X, CH_2-CH_2-CH_2X, O-CH_2-CH_2-CH_2X (wherein X = F, Cl, Br or I), CN, (C = O)-R', $N(R')_2$, NO_2, (C = O)$N(R')_2$, O(CO)R', OR', SR', COOR', R_{ph}, CR' = CR'-R_{ph} and CR_2'-CR_2'-R_{ph} (wherein R_{ph} represents an unsubstituted or substituted phenyl group with the phenyl substituents being chosen from any of the non-phenyl substituents defined for R^{17}-R^{20} and wherein R' is H or a lower alkyl group).

3. The compound of claim 1, wherein, Z = S, Y = N, R^1 = H; and

wherein when the amyloid binding compound of claim 1 is structure A or E, then R^2 is selected from the group consisting of a lower alkyl group, $(CH_2)_nOR'$ (wherein n = 1, 2, or 3), CF_3, CH_2-CH_2X, CH_2-CH_2-CH_2X (wherein X = F, Cl, Br or I), (C = O)-R', R_{ph}, and $(CH_2)_nR_{ph}$ wherein n = 1, 2, 3, or 4;

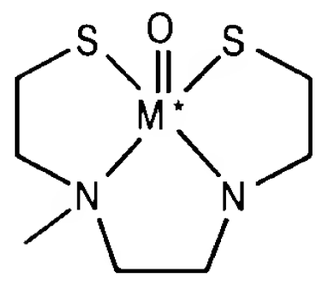
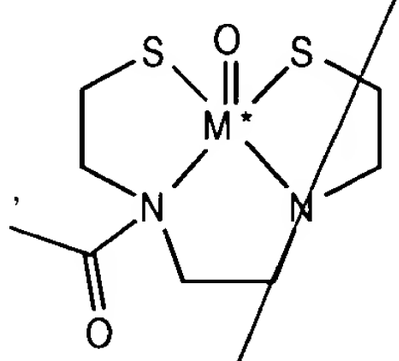
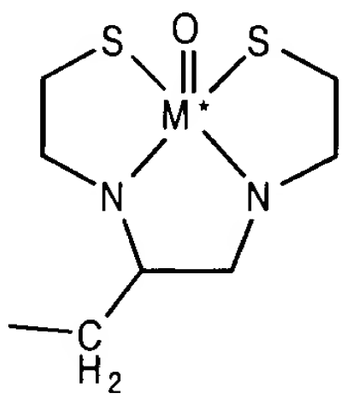
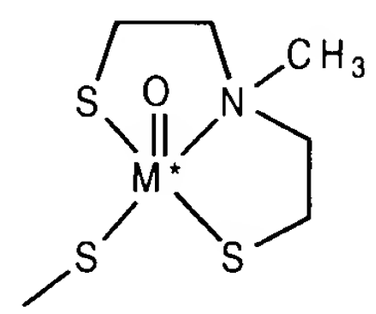
wherein when the amyloid binding compound of claim 1 is structure B, then R^2 is selected from the group consisting of $(CH_2)_nOR'$ (wherein n = 1, 2, or 3, and where when R' = H or CH_3, n is not 1). CF_3, CH_2-CH_2X and CH_2-CH_2-CH_2X (wherein X = F, Cl, Br or I);

wherein when the amyloid binding compound of claim 1 is structure C, then R^2 is selected from the group consisting of a lower alkyl group, $(CH_2)_nOR'$ (wherein n = 1, 2, or 3, CF_3), CH_2-CH_2X, CH_2-CH_2-CH_2X (wherein X = F, Cl, Br or I), (C = O)-H, R_{ph}, and $(CH_2)_nR_{ph}$ wherein n = 1, 2, 3, or 4; and

wherein when the amyloid binding compound of claim 1 is structure D, then R^2 is selected from the group consisting of $(CH_2)_nOR'$ (wherein n = 1, 2, or 3), CF_3, CH_2-CH_2X, CH_2-CH_2-CH_2X (wherein X = F, Cl, Br or I), (C = O)-R', R_{ph}, and $(CH_2)_nR_{ph}$ (wherein n = 1, 2, 3, or 4) wherein when R^2 is CH_2R_{ph} R^8 is not CH_3.

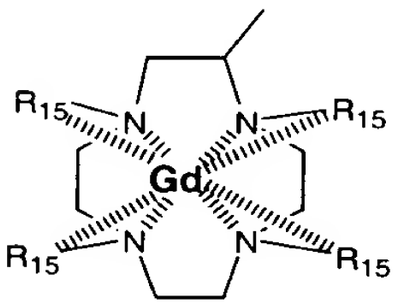
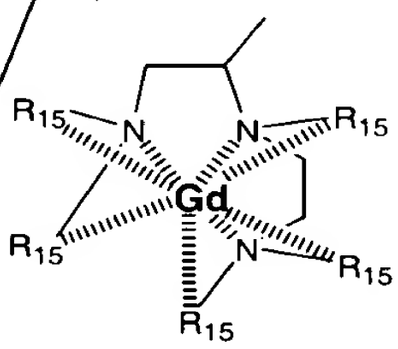
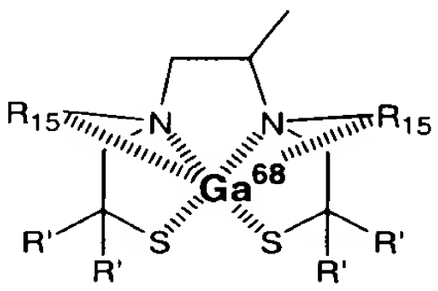
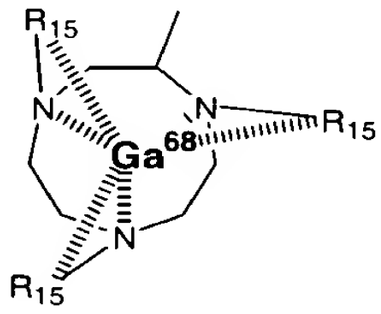
4. The compound of claim 3, wherein at least one of the substituents R^3- R^{14} is selected from the group consisting of ^{131}I, ^{123}I, ^{76}Br, ^{75}Br, ^{18}F, CH_2-CH_2-X*, O-

CH_2-CH_2-X*, CH_2-CH_2-CH_2-X*, O- CH_2-CH_2-CH_2-X* (wherein X* = ^{131}I, ^{123}I, ^{76}Br, ^{75}Br or ^{18}F), ^{19}F, ^{125}I, a carbon-containing substituent as specified in claim 1 wherein at least one carbon is ^{11}C or ^{13}C, a chelating group (with chelated metal group) of the form W-L* or V-W-L*, wherein V is selected from the group consisting of –COO-, -CO-, -CH_2O- and -CH_2NH-; W is –$(CH_2)_n$ where n=0,1,2,3,4, or 5; and L* is:

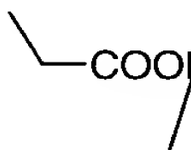
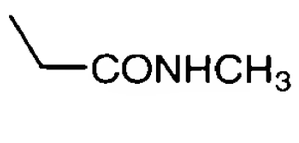
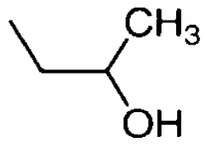
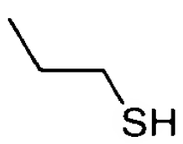
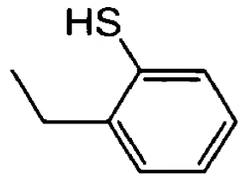
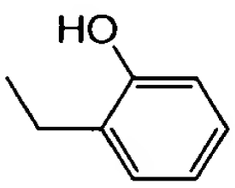



or


wherein M* is ^{99m}Tc;

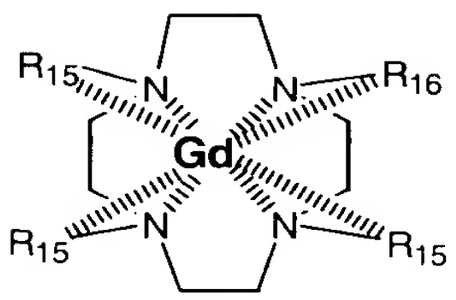
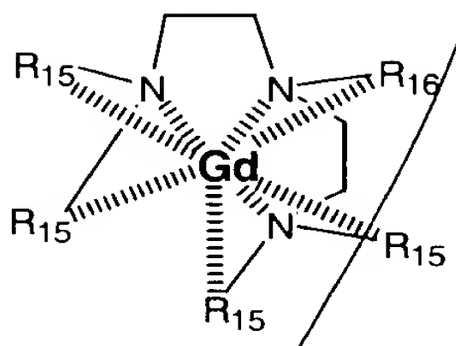
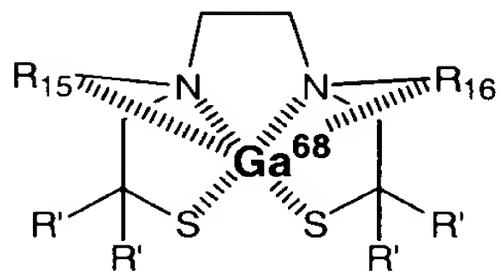
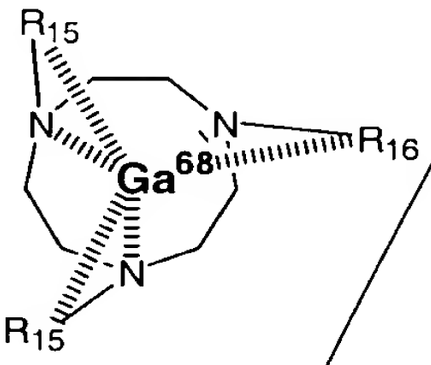
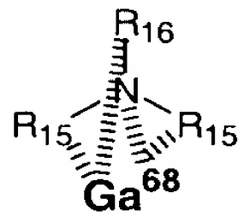
and a chelating group (with chelated metal group) of the form W-L* or V-W-L*, wherein V is selected from the group consisting of –COO-, -CO-, -CH_2O- and -CH_2NH-; W is –$(CH_2)_n$ where n=0,1,2,3,4, or 5; and L* is:




or


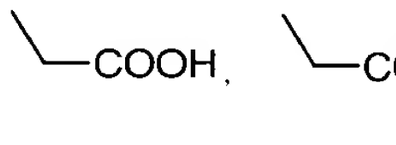
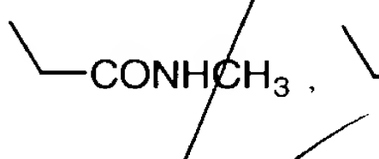
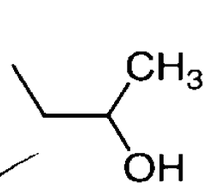
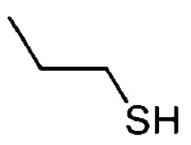
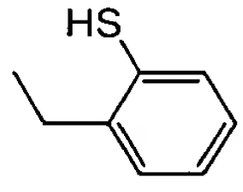
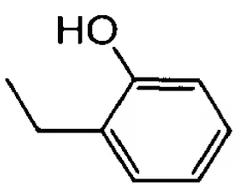
and wherein R^{15} independently is selected from the following:

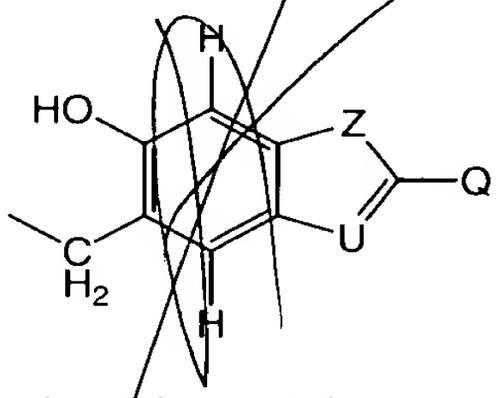
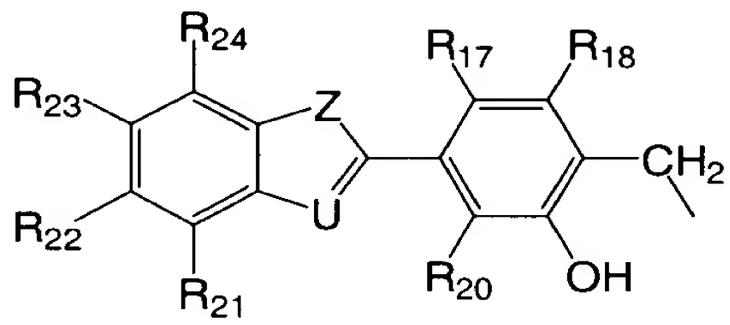
H,  ,  ,  ,  ,  or  ;

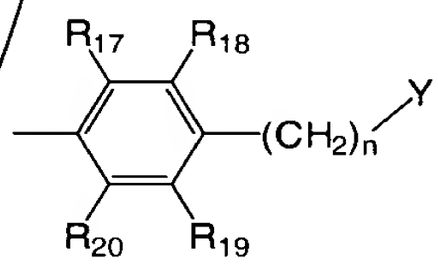
or the chelating compound of claim 1 (with chelated metal group) of the form:

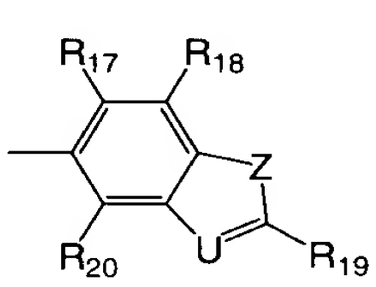
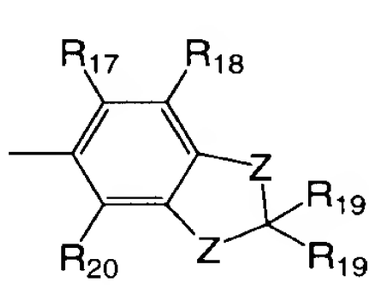




or


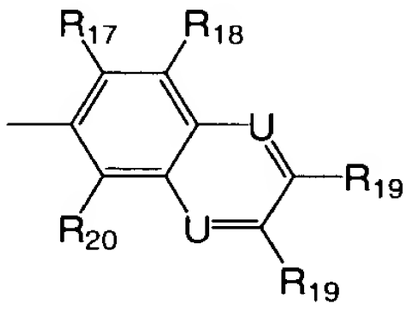
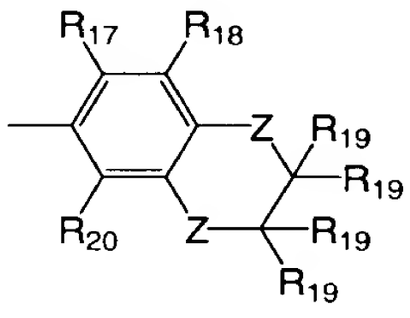
wherein R^{15} independently is selected from one of the following structures:

H,  ,  ,  ,  ,  or 

and R^{16} is  or  , wherein Q is independently selected from one of the following structures:

 wherein n = 0, 1, 2, 3 or 4,

 ,  ,

 or 

wherein Z is S, NR', O, or $C(R')_2$ in which R' is H or a lower alkyl group;

wherein U is N or CR';

wherein Y is NR^1R^2, OR^2, or SR^2 ;

wherein each R^{17}-R^{24} independently is selected from the group consisting of H, F, Cl, Br, I, a lower alkyl group, $(CH_2)_nOR'$ (wherein n = 1, 2, or 3), CF_3, CH_2-CH_2X, O-CH_2-CH_2X, CH_2-CH_2-CH_2X, O-CH_2-CH_2-CH_2X (wherein X = F, Cl, Br or I), CN, (C = O)-R', $N(R')_2$, NO_2, (C = O)$N(R')_2$, O(CO)R', OR', SR', COOR', R_{ph}, CR' = CR'-R_{ph} and CR_2'-CR_2'-R_{ph} (wherein R_{ph} represents an unsubstituted or substituted phenyl group with the phenyl substituents being chosen from any of the non-phenyl substituents defined for R^{17}-R^{20} and wherein R' is H or a lower alkyl group).

5. The compound of claim 1, structure A-E, wherein, Z = S, Y = N, R' = H, R^1 = H, $R^2 = CH_3$ and R^3- R^{14} are H.

6. The compound of claim 1, structure A-E, wherein, Z = S, Y = O, R' = H, $R^2 = CH_3$ and R^3- R^{14} are H.

7. The compound of claim 1, structure A-E, wherein Z = S, Y = N, R' = H, R^{1-4} = H, R^5 = I, and R^6- R^{14} are H.

8. The compound of claim 1, structure A-E, wherein Z = S, Y = N, R' = H, R^{1-4} = H, R^5 = I, R^8 = OH and R^6- R^7 and R^9- R^{14} are H.

9. The compound of claim 1, structure A-E, wherein, Z = S, Y = N, R' = H, R^1 = H, R^2 = CH_2-CH_2-CH_2-F and R^3- R^{14} are H.

10. The compound of claim 1, structure A-E, wherein, Z = S, Y = O, R' = H, R^2 = CH_2-CH_2-F and R^3- R^{14} are H.

11. The compound of claim 1, structure A-E, wherein Z = S, Y = N, R' = H, R^{1-7} = H, R^8 = O-CH_2-CH_2-F and R^9- R^{14} are H.

12. The compound of claim 1, structure A-E, wherein Z = S, Y = N, R' = H, $R^1 = CH_3$, R^{2-7} = H, R^8 = O-CH_2-CH_2-F and R^9- R^{14} are H.

13. The compound of claim 1, structure F-J, wherein, Z = S, Y = N, R' = H, R^1 = H, R^2 = CH_3 and R^3- R^{14} are H.

14. The compound of claim 1, structure F-J, wherein, Z = S, Y = O, R' = H, R^2 = CH_3 and R^3- R^{14} are H.

15. The compound of claim 1, structure F-J, wherein Z = S, Y = N, R' = H, R^{1-4} = H, R^5 = I, and R^6- R^{14} are H.

16. The compound of claim 1, structure F-J, wherein Z = S, Y = N, R' = H, R^{1-4} = H, R^5 = I, R^8 = OH and R^6- R^7 and R^9- R^{14} are H.

17. The compound of claim 1, structure F-J, wherein, Z = S, Y = N, R' = H, R^1 = H, R^2 = CH_2-CH_2-CH_2-F and R^3- R^{14} are H.

18. The compound of claim 1, structure F-J, wherein, Z = S, Y = O, R' = H, R^2 = CH_2-CH_2-F and R^3- R^{14} are H.

19. The compound of claim 1, structure F-J, wherein Z = S, Y = N, R' = H, R^{1-7} = H, R^8 = O-CH_2-CH_2-F and R^9- R^{14} are H.

20. The compound of claim 1, structure F-J, wherein Z = S, Y = N, R' = H, R^1 = CH_3, R^{2-7} = H, R^8 = O-CH_2-CH_2-F and R^9- R^{14} are H.

21. The compound of claim 3, wherein at least one of the substituents R^3 -R^{14} is selected from the group consisting of CN, OCH_3, OH and NH_2.

22. The compound of claim 1, wherein the amyloid binding compound is selected from the group consisting of structure B, structure C and structure D; wherein R^1 = H, R^2 = CH_3 and R^8 is selected from the group consisting of CN, CH_3, OH, OCH_3 and NH_2.

23. The compound of claim 22, wherein R^3- R^7 and R^9- R^{14} are H.

24. The compound of claim 1, wherein the compound binds to Aβ with a dissociation constant (K_D) between 0.0001 and 10.0μM when measured by binding to synthetic Aβ peptide or Alzheimer's Disease brain tissue.

25. The compound of claim 3, wherein the compound binds to Aβ with a dissociation constant (K_D) between 0.0001 and 10.0μM when measured by binding to synthetic Aβ peptide or Alzheimer's Disease brain tissue.

26. A method for synthesizing a compound of claim 1 having at least one of the substituents R^1-R^{14} selected from the group consisting of ^{131}I, ^{125}I, ^{123}I, ^{76}Br, ^{75}Br, ^{18}F, and ^{19}F, comprising the step of labeling a compound of claim 1 wherein at least one of the substituents R^1-R^{14} is a tri-alkyl tin, by reaction of the compound with a ^{131}I, ^{125}I, ^{123}I, ^{76}Br, ^{75}Br, ^{18}F, or ^{19}F containing substance.

27. A method for synthesizing a compound of claim 1 having at least one of the substituents R^3- R^{14} selected from the group consisting of ^{131}I, ^{125}I, ^{123}I, ^{76}Br, ^{75}Br, ^{18}F, and ^{19}F, comprising the step of labeling a compound of claim 1, structures A-E or F-J, wherein Z = S, Y = N, R^1 = H and at least one of the substituents R^3 -R^{14} is a tri-alkyl tin, by reaction of the compound with a ^{131}I, ^{125}I, ^{123}I, ^{76}Br, ^{75}Br, ^{18}F, or ^{19}F containing substance.

28. A pharmaceutical composition for *in vivo* imaging of amyloid deposits, comprising (a) a compound of claim 1 and (b) a pharmaceutically acceptable carrier.

29. A pharmaceutical composition for *in vivo* imaging of amyloid deposits, comprising (a) a compound of claim 1, structures A-E or F-J, wherein Z = S, Y = N, R^1 = H, and (b) a pharmaceutically acceptable carrier.

30. An *in vivo* method for detecting amyloid deposits in a subject, comprising the steps of:

(a) administering a detectable quantity of the pharmaceutical composition of claim 28, and

(b) detecting the binding of the compound to amyloid deposit in the subject.

31. The method of claim 30, wherein the amyloid deposit is located in the brain of a subject.

32. The method of claim 30, wherein the subject is suspected of having a disease or syndrome selected from the group consisting of Alzheimer's Disease, familial Alzheimer's Disease, Down's Syndrome and homozygotes for the apolipoprotein E4 allele.

33. The method of claim 30, wherein the detecting is selected from the group consisting of gamma imaging, magnetic resonance imaging and magnetic resonance spectroscopy.

34. The method of claim 33, wherein the detecting is done by gamma imaging, and the gamma imaging is either PET or SPECT.

35. The method of claim 30, wherein the pharmaceutical composition is administered by intravenous injection.

36. The method of claim 30, wherein the ratio of (i) binding of the compound to a brain area other than the cerebellum to (ii) binding of the compound to the cerebellum, in the subject, is compared to the ratio in normal subjects.

37. A method of detecting amyloid deposits in biopsy or post-mortem human or animal tissue comprising the steps of:

(a) incubating formalin-fixed or fresh-frozen tissue with a solution of a compound of claim 1 to form a labeled deposit and then,

(b) detecting the labeled deposits.

38. The method of claim 37 wherein the solution is composed of 25-100% ethanol, with the remainder of the solution being water, wherein the solution is saturated with the compound having one of structures A-E or F-J.

39. The method of claim 37 wherein the solution is composed of an aqueous buffer containing 0-50% ethanol, wherein the solution contains 0.0001 to 100 μM of the compound having one of structures A-E or F-J.

40. The method of claim 37 wherein the detecting is effected by microscopic techniques selected from the group consisting of bright-field, fluorescence, laser-confocal, and cross-polarization microscopy.

41. A method of quantifying the amount of amyloid in biopsy or post-mortem tissue comprising the steps of:

a) incubating a radiolabeled derivative of a compound of claim 1 with a homogenate of biopsy or post-mortem tissue, wherein at least one of the substituents R^1-R^{14} of the compound is labeled with a radiolabel selected from the group consisting of ^{125}I, ^{3}H, and a carbon-containing substituent as specified in claim 1, wherein at least one carbon is ^{14}C,

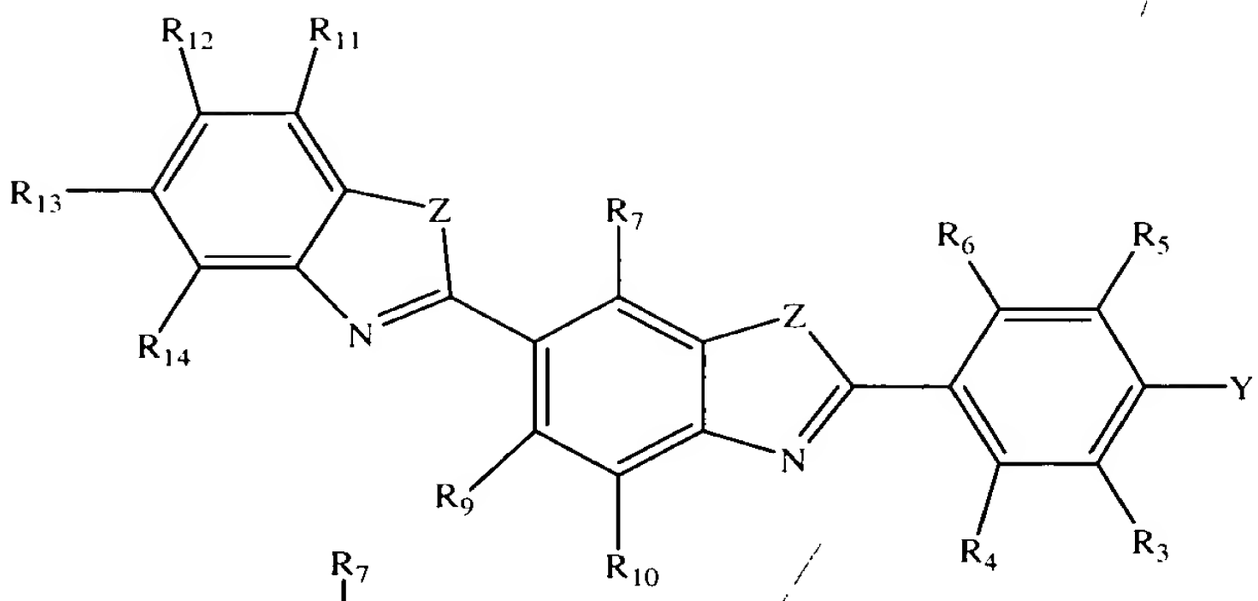
b) separating the tissue-bound from the tissue-unbound radiolabeled derivative of a compound of claim 1,

c) quantifying the tissue-bound radiolabeled derivative of a compound of claim 1, and

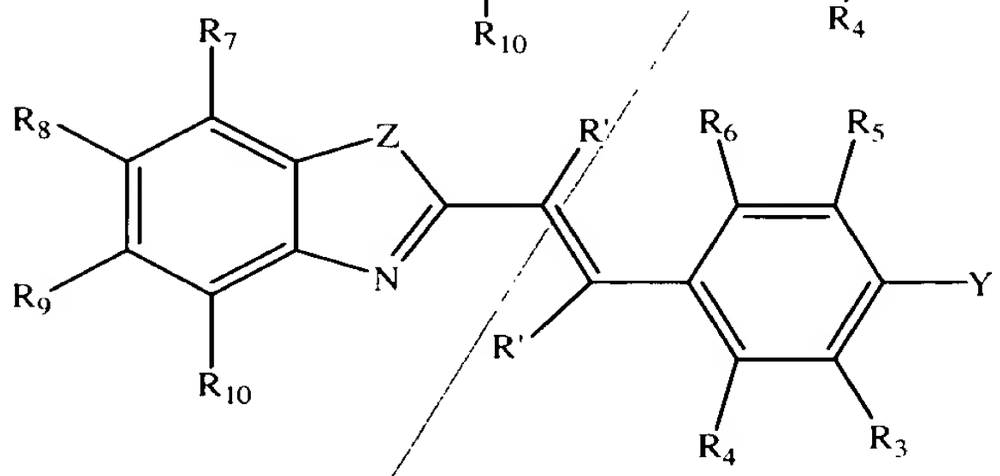
d) converting the units of tissue-bound radiolabeled derivative of a compound of claim 1 to units of micrograms of amyloid per 100 mg of tissue by comparison with a standard.

42. The method of claim 41, wherein the radiolabeled derivative is an amyloid binding compound having one of structures A-E or a water soluble, non-toxic salt thereof:

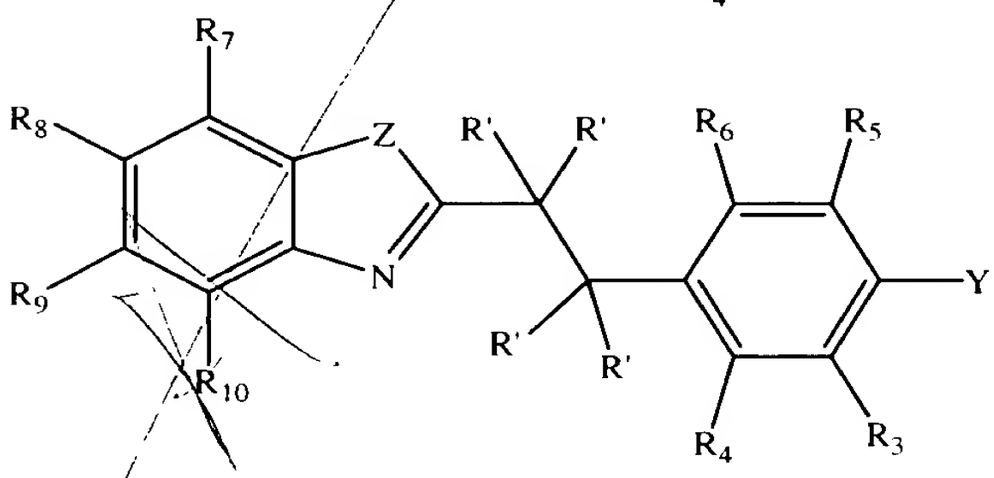
Structure A



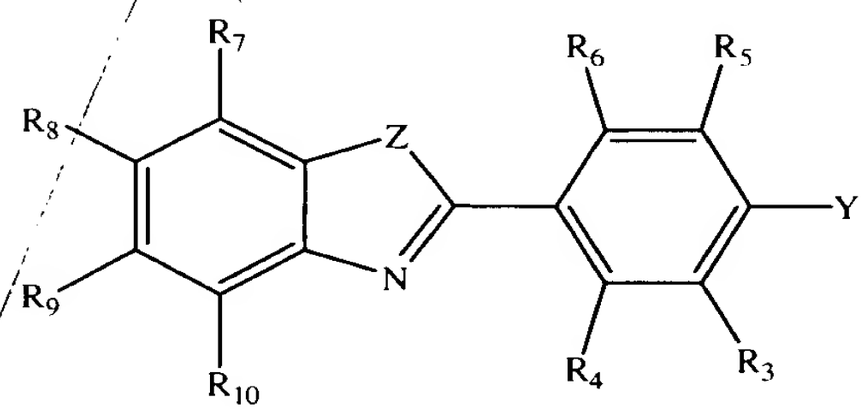
Structure B



Structure C

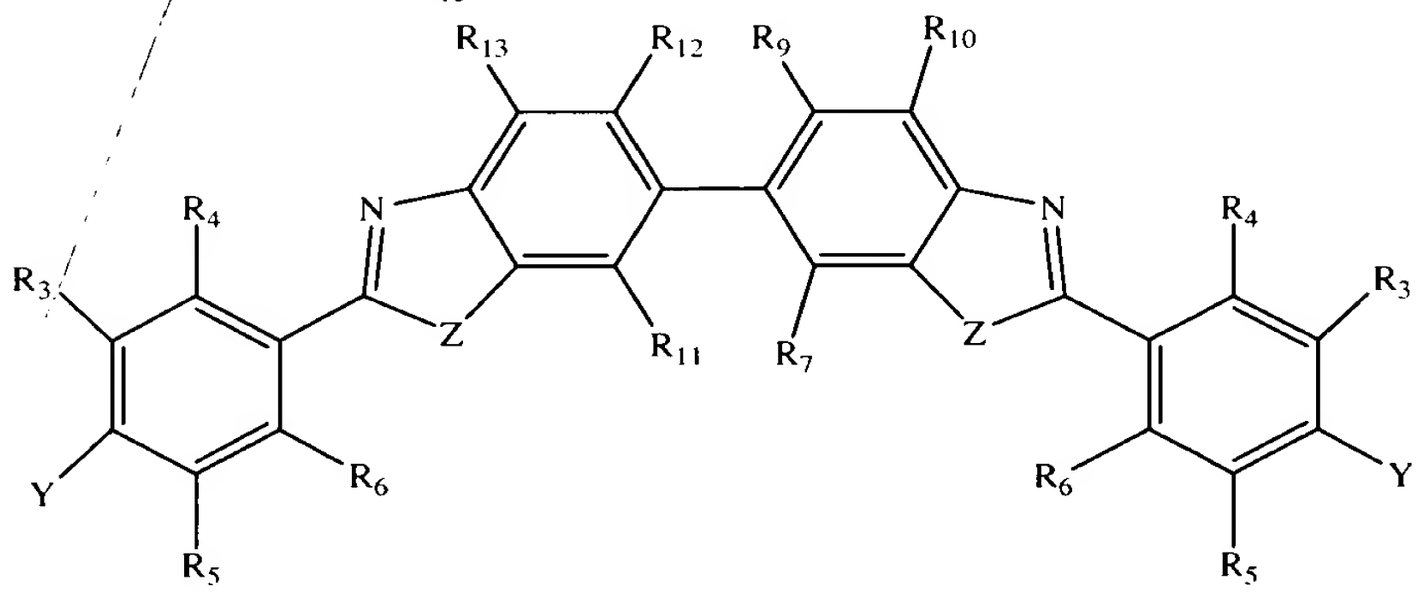


Structure D

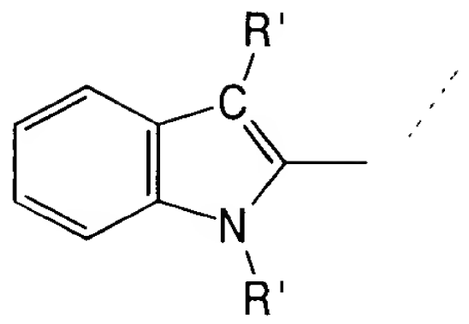


or

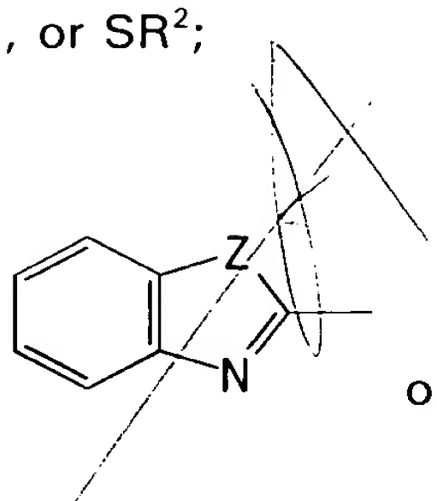
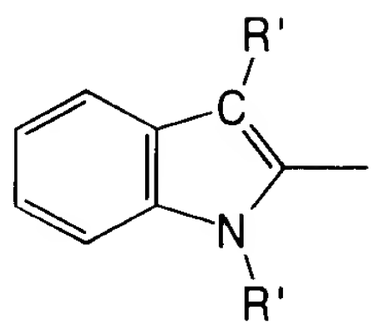
Structure E



wherein Z is S, NR', O or CR' in which case the correct tautomeric form of the heterocyclic ring becomes an indole in which R' is H or a lower alkyl group:

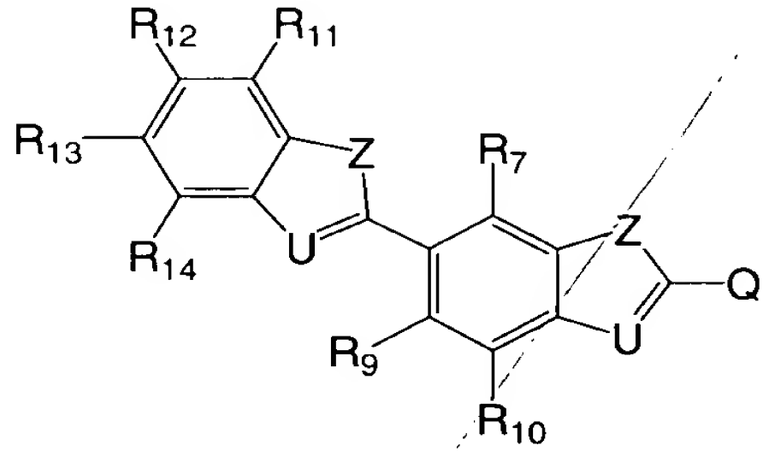


wherein Y is NR^1R^2, OR^2, or SR^2;

wherein the nitrogen of  or  is not a quaternary amine;

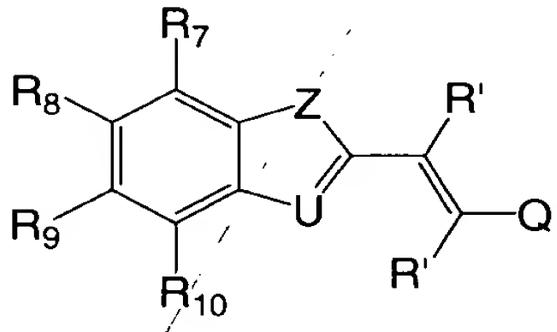
or an amyloid binding compound having one of structures F-J or a water soluble, non-toxic salt thereof:

Structure F



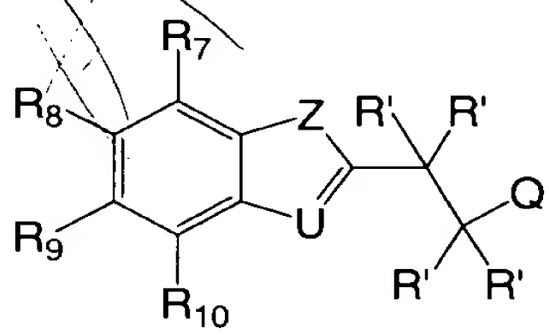
,

Structure G



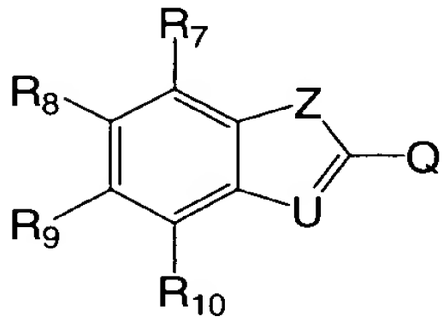
,

Structure H



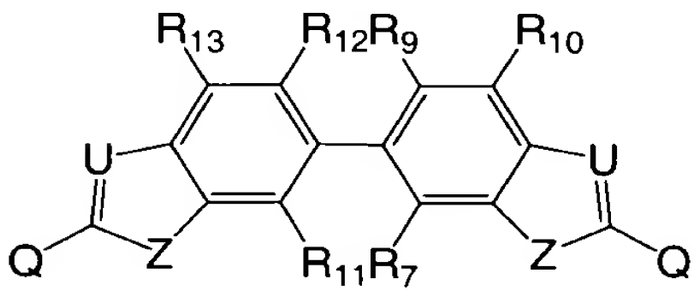
,

Structure I

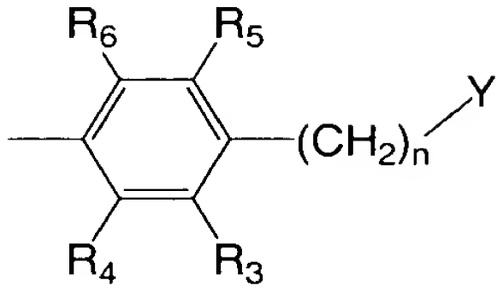


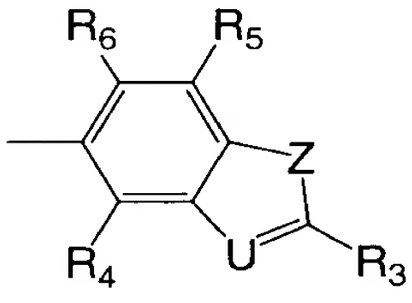
or

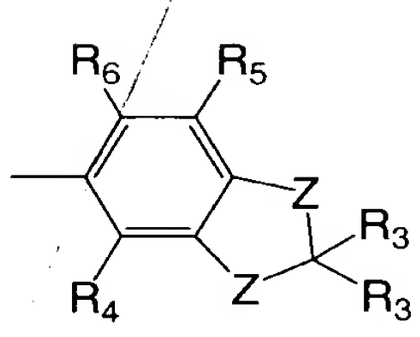
Structure J

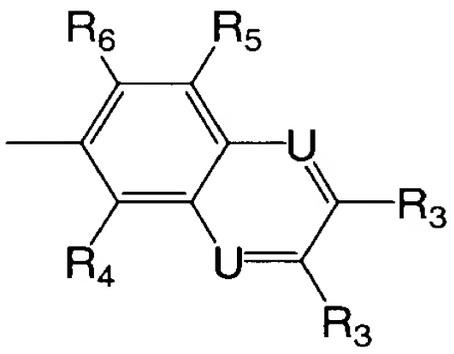


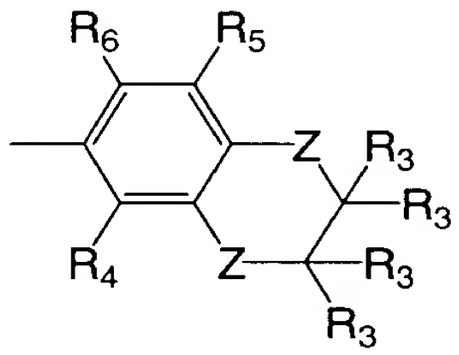
wherein each Q is independently selected from one of the following structures:


wherein n = 0, 1, 2, 3 or 4,

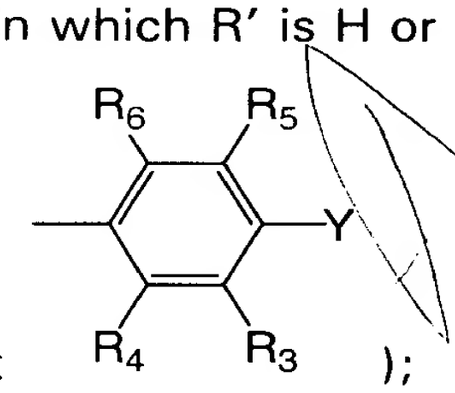

,


,

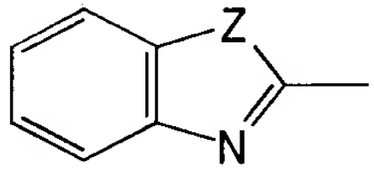
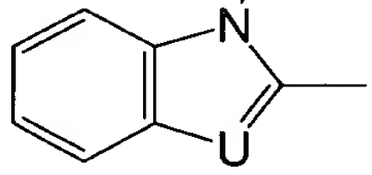

or



wherein Z is S, NR', O, or $C(R')_2$ in which R' is H or a lower alkyl group;

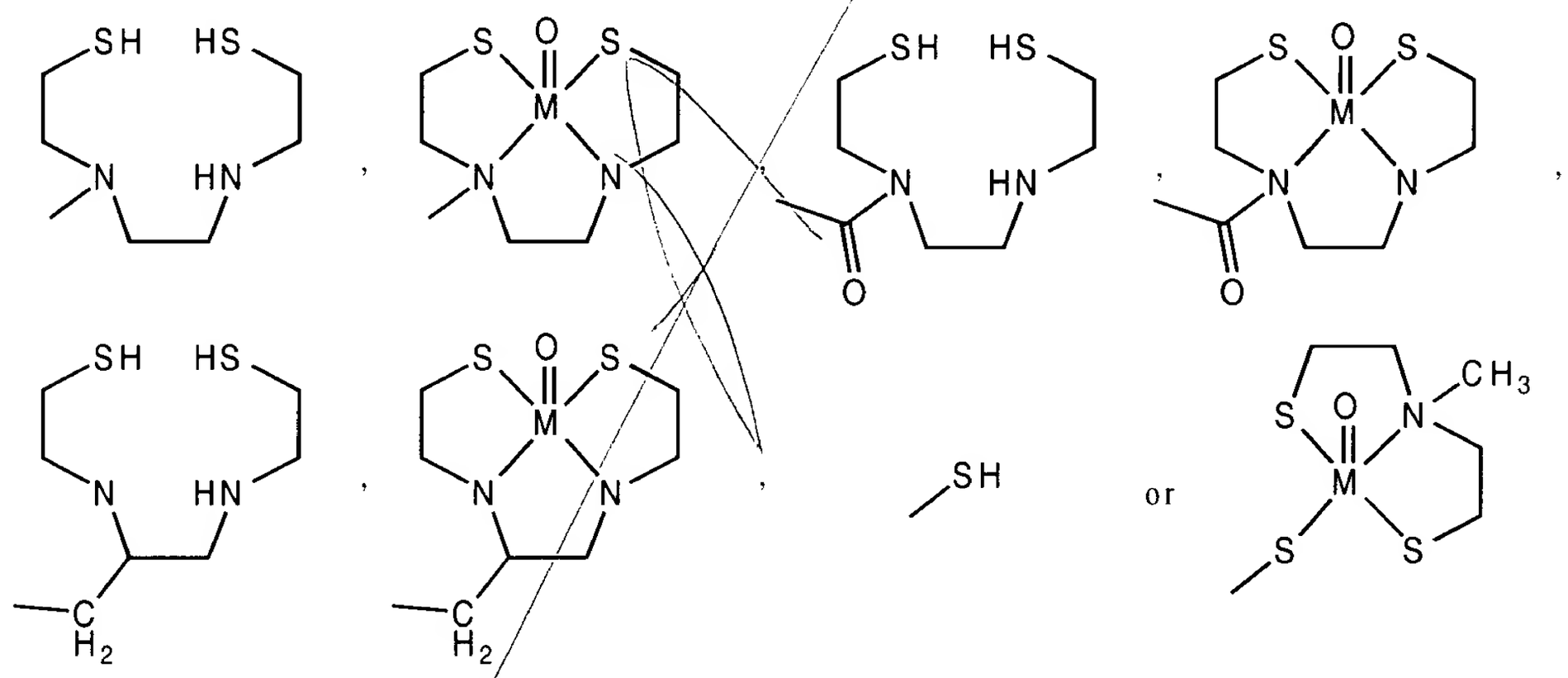
wherein U is CR' (in which R' is H or a lower alkyl group) or N (except when U = N, then Q is not );

wherein Y is NR^1R^2, OR^2, or SR^2;

wherein the nitrogen of  or  is not a quaternary amine;

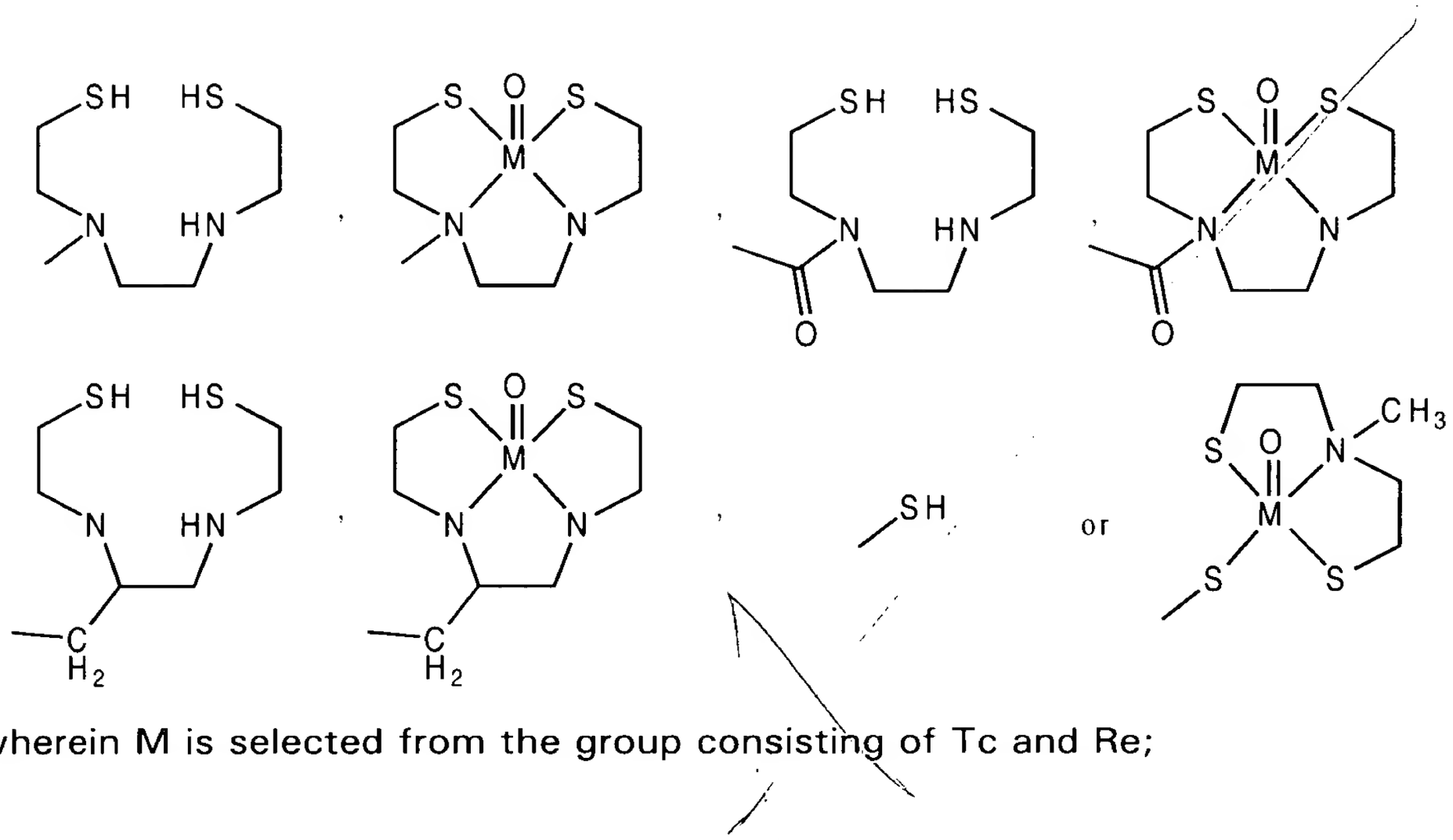
wherein each R^1 and R^2 independently is selected from the group consisting of H, a lower alkyl group, $(CH_2)_nOR'$ (wherein n = 1, 2, or 3), CF_3, CH_2-CH_2X, CH_2-CH_2-CH_2X (wherein X = F, Cl, Br or I), (C = O)-R', R_{ph}, and $(CH_2)_nR_{ph}$ (wherein n = 1, 2, 3, or 4 and R_{ph} represents an unsubstituted or substituted phenyl group with the phenyl substituents being chosen from any of the non-phenyl substituents defined below for R^3-R^{14} and R' is H or a lower alkyl group);

and wherein each R^3-R^{14} independently is selected from the group consisting of H, F, Cl, Br, I, a lower alkyl group, $(CH_2)_nOR'$ (wherein n = 1, 2, or 3), CF_3, CH_2-CH_2X, O-CH_2-CH_2X, CH_2-CH_2-CH_2X, O-CH_2-CH_2-CH_2X (wherein X = F, Cl, Br or I), CN, (C = O)-R', $N(R')_2$, NO_2, (C = O)$N(R')_2$, O(CO)R', OR', SR', COOR', R_{ph}, CR' = CR'-R_{ph}, CR_2'-CR_2'-R_{ph} (wherein R_{ph} represents an unsubstituted or substituted phenyl group with the phenyl substituents being chosen from any of the non-phenyl substituents defined for R^1-R^{14} and wherein R' is H or a lower alkyl group), a tri-alkyl tin and a chelating group (with or without a chelated metal group) of the form W-L or V-W-L, wherein V is selected from the group consisting of –COO-, -CO-, -CH_2O- and -CH_2NH-; W is $-(CH_2)_n$ where n = 0,1,2,3,4, or 5; and L is:



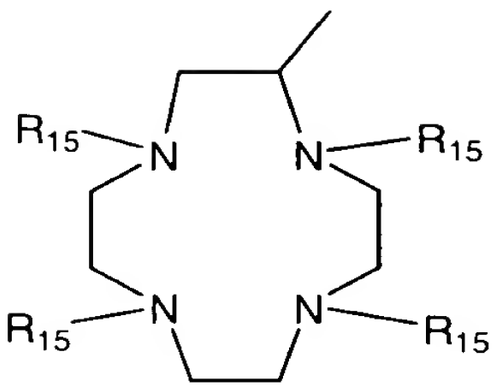
wherein M is selected from the group consisting of Tc and Re;

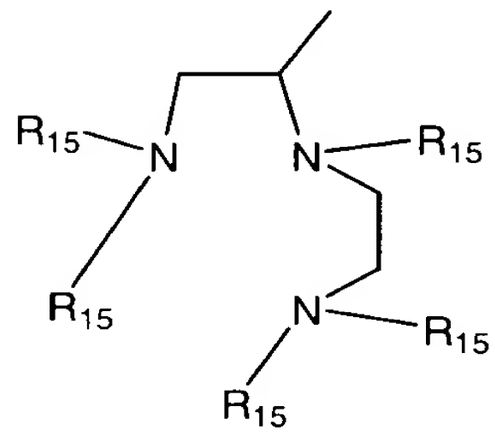
or wherein each R^1 and R^2 is a chelating group (with or without a chelated metal group) of the form W-L , wherein W is $-(CH_2)_n$ where n = 2,3,4, or 5; and L is:

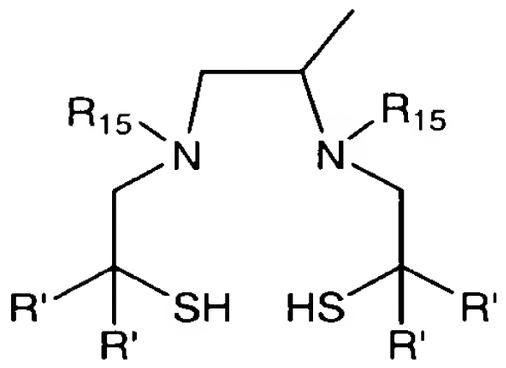


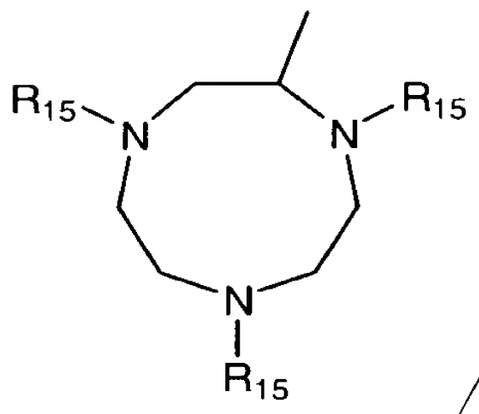
wherein M is selected from the group consisting of Tc and Re;

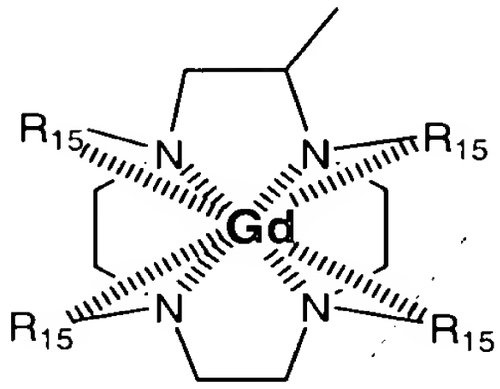
or wherein each R^1 –R^{14} independently is selected from the group consisting of a chelating group (with or without a chelated metal ion) of the form W-L and V-W-L, wherein V is selected from the group consisting of –COO-, and -CO-; W is –$(CH_2)_n$ where n = 0,1,2,3,4, or 5; L is:

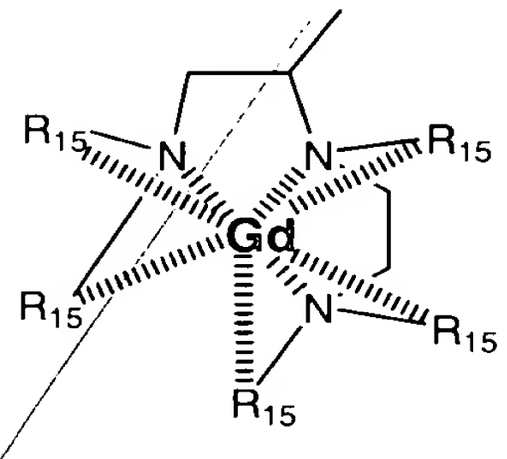


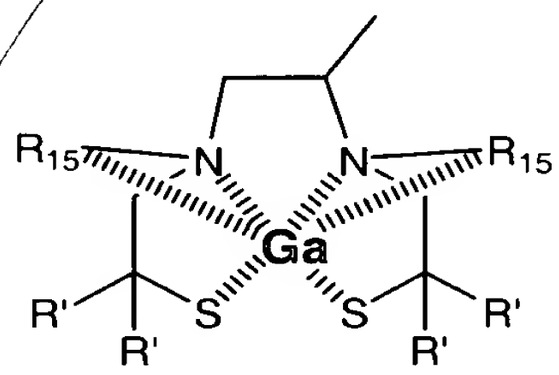


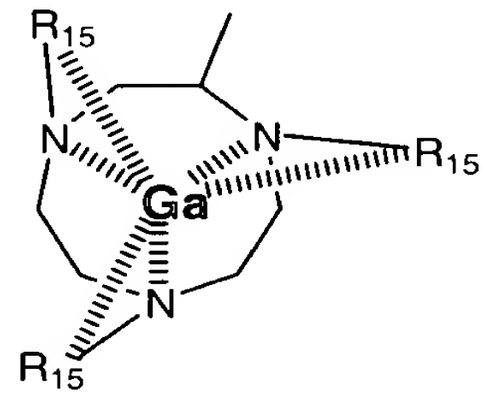






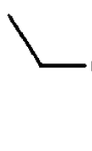
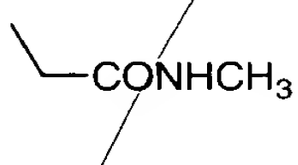
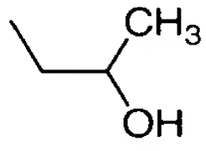
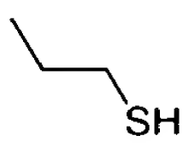
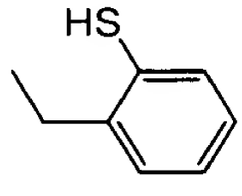
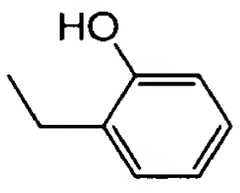




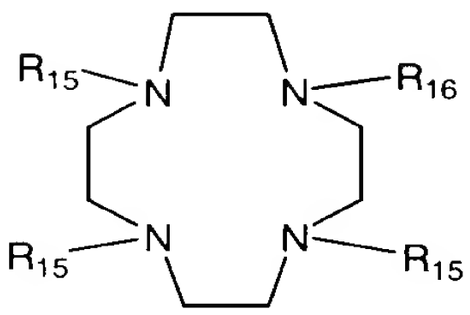


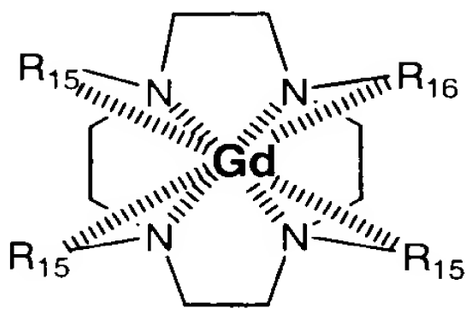
or

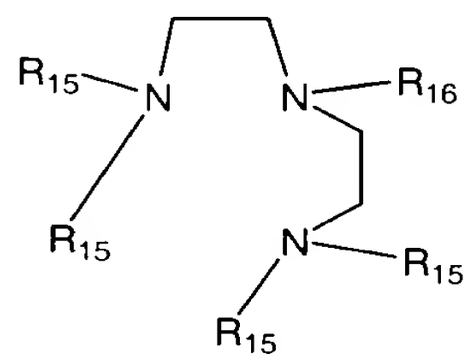
and wherein R^{15} independently is selected from the following:

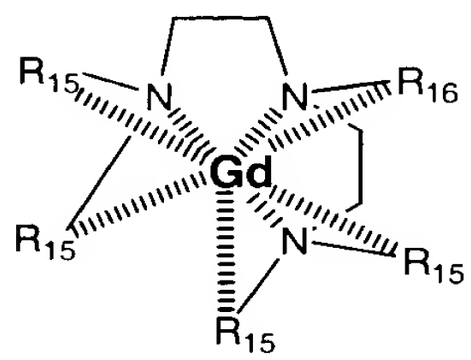
H,      or  ;

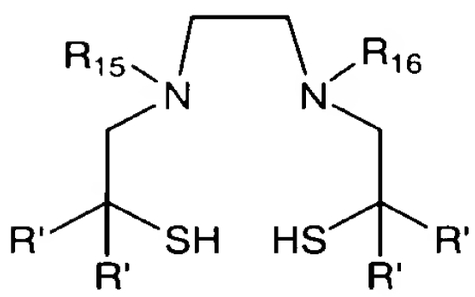
or an amyloid binding, chelating compound (with or without a chelated metal group) or a water soluble, non-toxic salt thereof of the form:

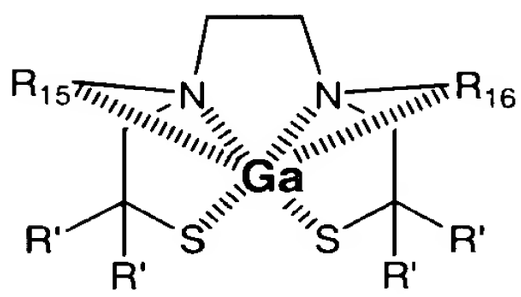


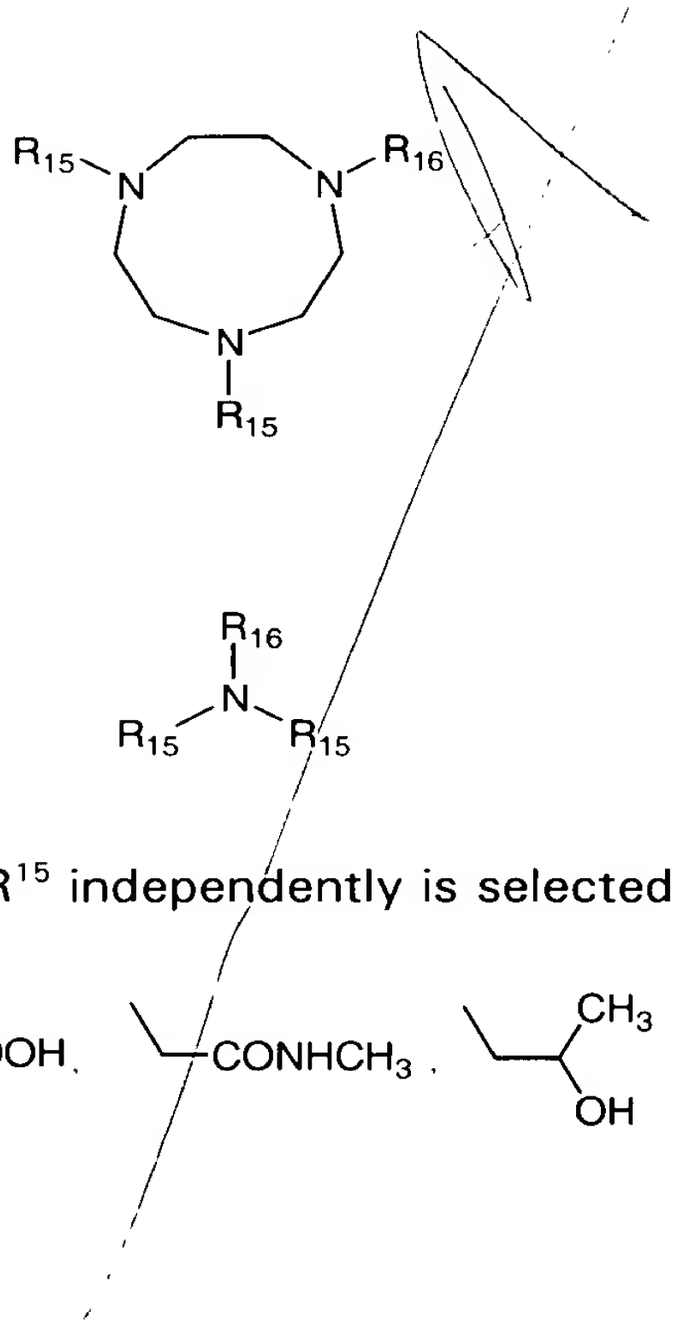


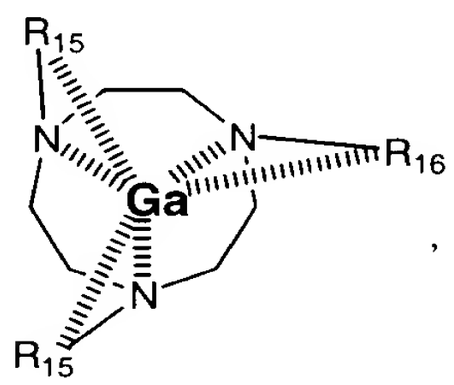




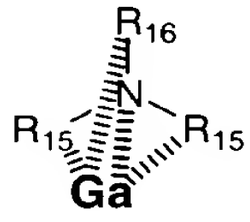






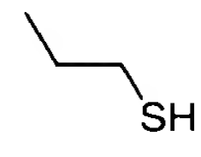
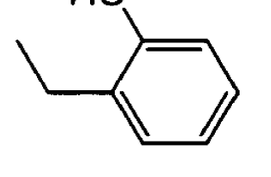
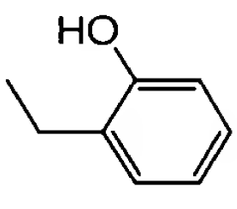


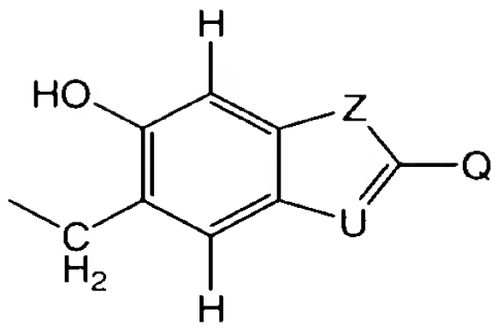
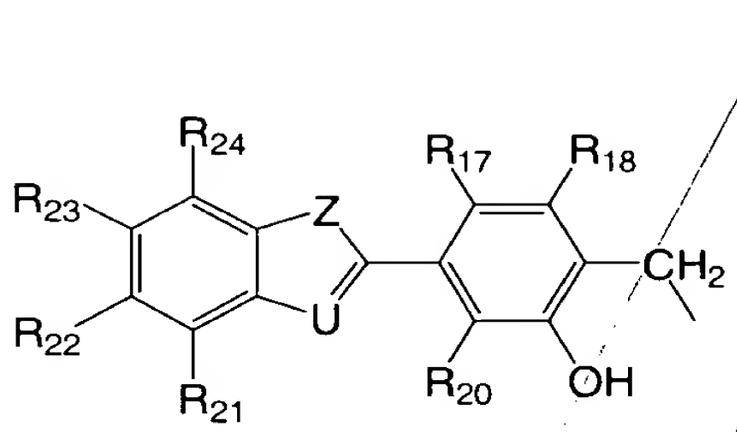
or

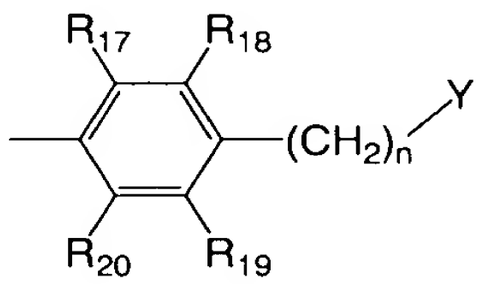


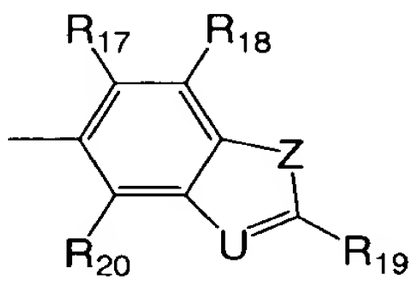
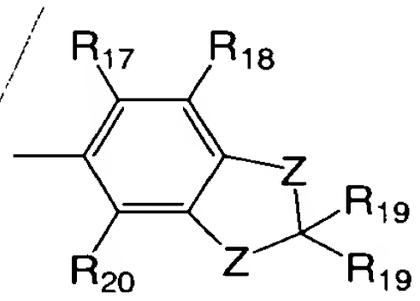
;

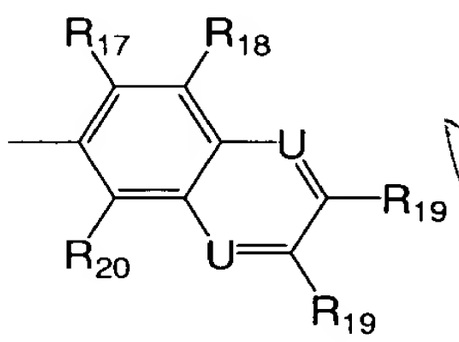
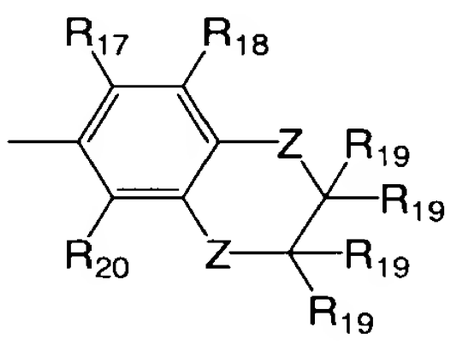
wherein R^{15} independently is selected from the following:

H, , ,  ,  , or 

and R^{16} is  or  , wherein Q is independently selected from one of the following structures:

 wherein n = 0, 1, 2, 3 or 4,

 ,  ,

 Or  ,

wherein Z is S, NR', O, or $C(R')_2$ in which R' is H or a lower alkyl group;

wherein U is N or CR';

wherein Y is NR^1R^2, OR^2, or SR^2;

wherein each R^{17}-R^{24} independently is selected from the group consisting of H, F, Cl, Br, I, a lower alkyl group, $(CH_2)_nOR'$ (wherein n = 1, 2, or 3), CF_3, CH_2-CH_2X, O-CH_2-CH_2X, CH_2-CH_2-CH_2X, O-CH_2-CH_2-CH_2X (wherein X = F, Cl, Br or I), CN, (C = O)-R', $N(R')_2$, NO_2, $(C=O)N(R')_2$, O(CO)R', OR', SR', COOR', R_{ph}, CR' = CR'-R_{ph} and CR_2'-CR_2'-R_{ph} (wherein R_{ph} represents an unsubstitutd or substituted phenyl group with the phenyl substituents being chosen from any of the non-phenyl substituents defined for R^{17}-R^{20} and wherein R' is H or a lower alkyl group).

43. A method of distinguishing an Alzheimer's disease brain from a normal brain comprising the steps of:

a) obtaining tissue from (i) the cerebellum and (ii) another area of the same brain other than the cerebellum, from normal subjects and from subjects suspected of having Alzheimer's disease;

b) incubating the tissues with a radiolabeled derivative of a compound of claim 1 derivative so that amyloid in the tissue binds with the radiolabeled derivative of a compound of claim 1;

c) quantifying the amount of amyloid bound to the radiolabeled derivative of a compound of claim 1, by administering a detectable quantity of the pharmaceutical composition comprising a compound of claim 1 with a pharmaceutically acceptable carrier, and detecting the binding of the compound to amyloid deposit in the subject;

d) calculating the ratio of the amount of amyloid in the area of the brain other than the cerebellum to the amount of amyloid in the cerebellum;

e) comparing the ratio for amount of amyloid in the tissue from normal subjects with ratio for amount of amyloid in tissue from subjects suspected of having Alzheimer's disease; and

f) determining the presence of Alzheimer's disease if the ratio from the brain of a subject suspected of having Alzheimer's disease is above 90% of the ratios obtained from the brains of normal subjects.